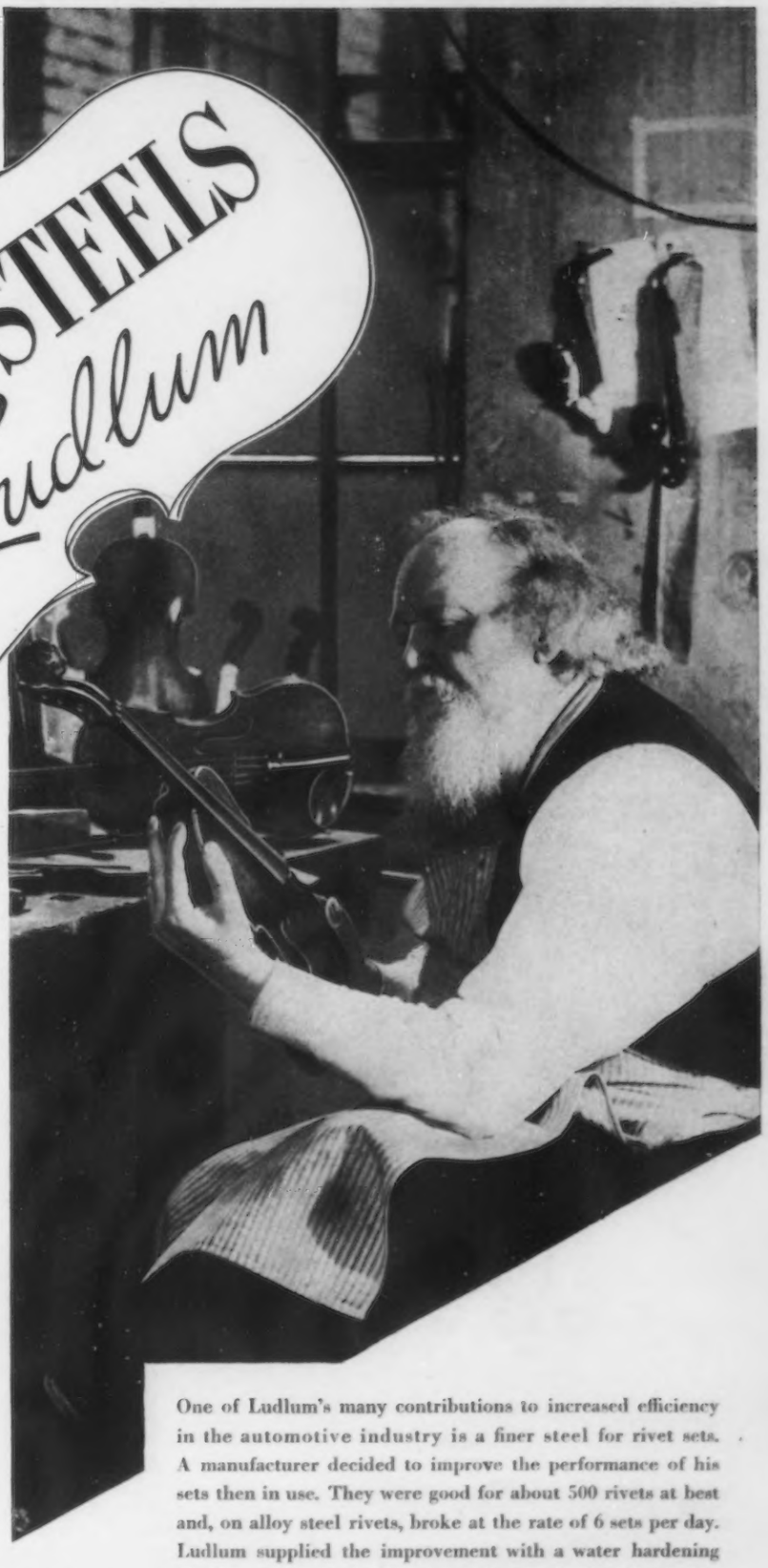
THE IRON AGE

DECEMBER 16, 1937

THE IRON AGE, published every Thursday by the *CHILTON CO. (INC.)* Publication Office, Chestnut & 56th Sts., Philadelphia, Pa. Editorial and Executive Offices, 239 W. 39th St., New York, N. Y. Entered as second class matter November 8, 1932, at the Post Office at Philadelphia under Act of March 3, 1879. $6.00 a year in U. S., Canada $8.50. Foreign $12.00. Vol. 140, No. 25.

In FINE STEELS it's Ludlum



NO skilled craftsman ever selected his materials and fitted together his parts with more care than Ludlum in the preparation of its alloy steels. Like a fine violin, these steels combine high quality and exact suitability to the requirements of the user. To make sure that what a customer specifies is actually the best for his purpose, Ludlum welcomes the opportunity to consult with him on any problem. Whether the problem involves study of manufacturing processes, laboratory experiments, or extensive testing of materials, the manufacturer is assured of honest recommendations by Ludlum engineers —without charge or obligation.

The advantages of Ludlum's far-reaching service are open to *you*. Just get in touch with the Research Department, Ludlum Steel Co., 1216 A Street, Watervliet, N. Y.

One of Ludlum's many contributions to increased efficiency in the automotive industry is a finer steel for rivet sets. A manufacturer decided to improve the performance of his sets then in use. They were good for about 500 rivets at best and, on alloy steel rivets, broke at the rate of 6 sets per day. Ludlum supplied the improvement with a water hardening shock resisting steel. The new tools ran off *4500 rivets* without a hitch, and one set was used on a hand operated air gun for *6 days* with complete satisfaction.

LUDLUM

FINE STEELS SINCE 1854

TOOL · STAINLESS · CARBON · ALLOY

Cincinnati Shapers are known throughout the world for their accurate performance. Cincinnati shears are machine tools for shearing metal. All-steel construction, accurate, fast, with new gauging methods . . . their very appearance expresses efficiency.

THE CINCINNATI SHAPER COMPANY, CINCINNATI, OHIO

Highflex Belting Saves You Time Because it Keeps Wheels Turning

Service, adjustments, replacements kept at rock bottom by this low stretch, long wearing, endless belt.

YOU production executives want the belt that saves time and money by delivering *continuous production.* That belt is Highflex—proven wherever belt records are kept.

Highflex was the first square edge duck belt, and has always been made with many exclusive features—the results of continuous Goodrich research.

Highflex assures improved resistance to ageing because it is made with Goodrich "Age-rite," a compound that resists oxidation and so increases the life of your belt. New Goodrich manufacturing devices prevent weak spots by keeping uniform stretch and pressure during cure.

A Highflex Belt runs straight, grips pulley evenly—preventing unnecessary wear. New surface treatment—no soapstone — provides firmer grip on pulley, prevents loss of power common to ordinary belts. Long flexing life: on testing machines Highflex stands three times as many flexures as five years ago.

Can Be Made Endless on Drive

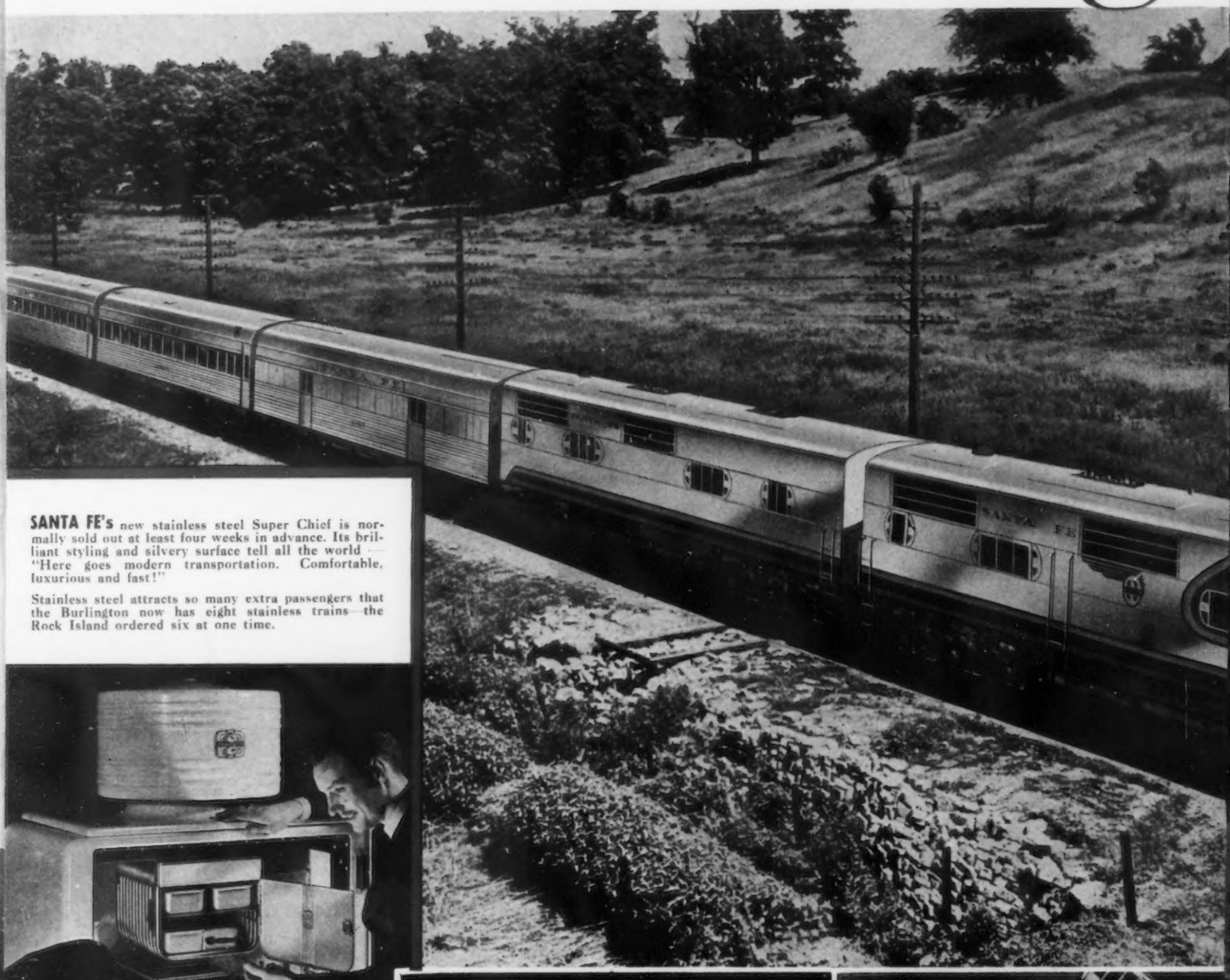
In addition to these exclusive, money-saving values, Highflex offers you another advantage. This is the patented Plylock Splice, by which Highflex Belts are made endless on the drive or in your Distributor's shop, in a few hours. The Plylock Splice lasts longer because it never opens at the seams. Thousands of companies are setting new records in low belt cost with Plylock. And, of course, Highflex can be used with fasteners, too.

Send for data and prices of Highflex Belts with Plylock Splice for your drives. Specify Highflex and you save money, save time and trouble, increase plant efficiency. The B. F. Goodrich Company, Mechanical Rubber Goods Division, Akron, Ohio.

Goodrich

ALL *products problems* IN RUBBER

IT'S THE *Selling*

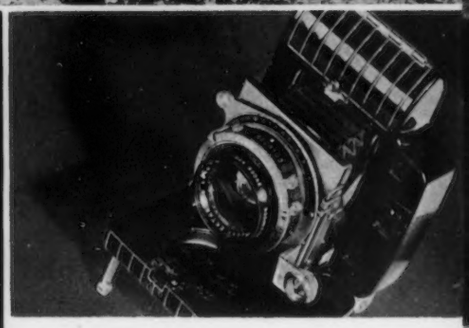


SANTA FE'S new stainless steel Super Chief is normally sold out at least four weeks in advance. Its brilliant styling and silvery surface tell all the world — "Here goes modern transportation. Comfortable, luxurious and fast!"

Stainless steel attracts so many extra passengers that the Burlington now has eight stainless trains—the Rock Island ordered six at one time.

GENERAL ELECTRIC REFRIGERATORS — both monitor-top and flat-top—have new sub-freezing units covered with brilliant stainless steel. GE engineers approve because stainless steel is chip-proof, crack-proof, tarnish-proof and virtually abuse-proof. GE sales executives approve because it gives them a new selling advantage.

TOAST MASTER COFFEE MAKERS in glistening stainless steel sell like hot cakes to drug stores, restaurants and roadside stands. Their modern and inviting sparkle helps to sell more food and more cups of coffee.



EASTMAN KODAK not only trim their smartly styled new Bantam miniature camera with stainless steel—but they make sure to mention this stainless trimming in their advertising.

Power OF STAINLESS STEEL

THERE is no other way to explain success after success of product after product made with stainless steel.

Stainless steel has a strong *emotional* appeal. From babyhood days, it is human nature to grasp instinctively for that which has a clean and brilliant sparkle.

Stainless steel also has a strong *rational* appeal. Today, every one knows that stainless steel is one of the strongest metals known to science; that it is the only metal which can maintain a silvery surface with no corrosion and no tarnishing. Every one knows that there is no known limit to the useful life of stainless steel . . . that it will last longer . . . give them a better job . . . and cost less per year of service.

There is no sounder aid to selling any product than that given by stainless steel—an attractive appearance supported by known technical excellence.

Give your product the benefit of stainless steel. If you have any questions, our stainless steel specialists will be glad to study your problem and submit specific, practical recommendations.

(Left)

GROGAN'S Prominent Pittsburgh jewelry house sells many watches in modern stainless steel cases because stainless steel can never tarnish or corrode, and it can be accurately machined to provide a water-tight closing.

(Right)

NATIONAL BISCUIT COMPANY find that novel stainless steel wire cake slicers boost their cake sales, and provide a smart merchandising touch in keeping with their glistening, transparent wrap.

ir smartly
h stainless
this stain-

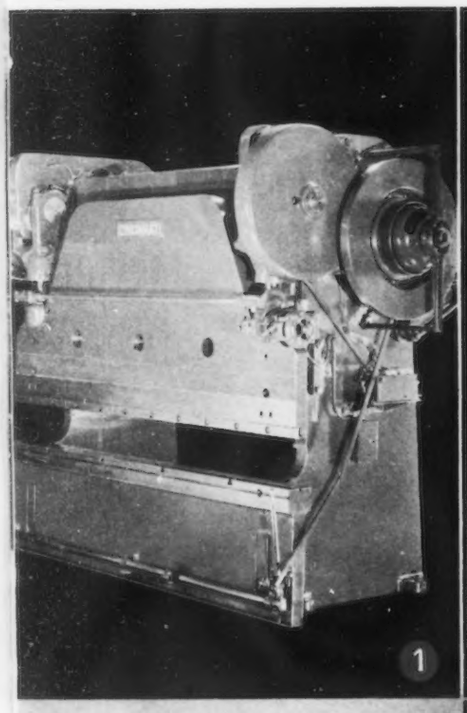
U·S·S STAINLESS STEEL

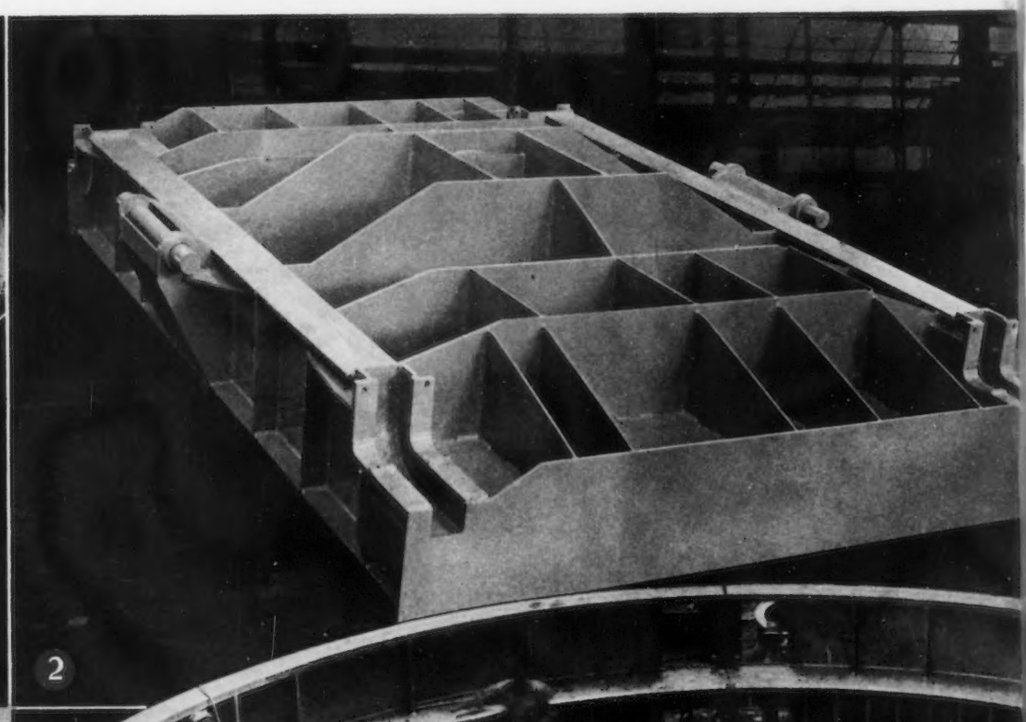
AMERICAN STEEL & WIRE COMPANY, *Cleveland, Chicago and New York*
CARNEGIE-ILLINOIS STEEL CORPORATION, *Pittsburgh and Chicago*
NATIONAL TUBE COMPANY, *Pittsburgh*

Columbia Steel Company, San Francisco, *Pacific Coast Distributors* · United States Steel Products Company, New York, *Export Distributors*

UNITED STATES STEEL

PICK *Special* STEELS

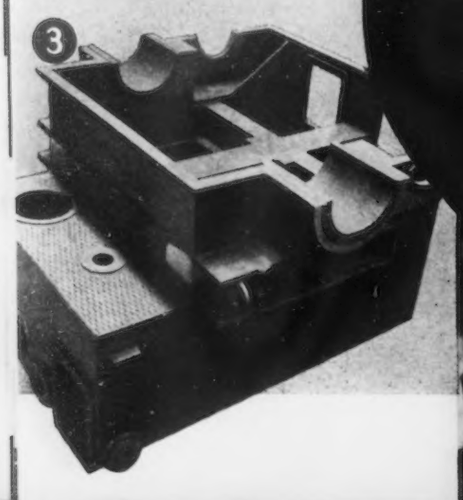




(1) COMPACT — MODERN. *This brake press illustrates the smooth, simple lines obtainable by rolled steel construction. Elimination of all non-essentials secures strength without bulk —reduces weight—conserves floor space —minimizes shipping costs.*

(2) STRONG—SAFE—LIGHT. *This all-welded one-piece trolley of USS* MAN-TEN *for the world's largest (200 ton) welded crane gives this important unit maximum safety with all excess weight eliminated. This crane and trolley of rolled steel construction will handle the same loads, faster, with smaller motors, and have an added factor of safety in that rolled steel has a consistency that is known, uniform and reliable. Decreased weight makes it possible to reduce weight of columns and footings—an important item in building.*

(3) STANDARD SHAPES SAVE MONEY HERE. *In this gear reduction case I-beams, plates, pipe, tubing, pipe fittings and floor plate are effectively combined at low cost by welding, to produce a complicated single structure.*



PRODUCED DIRECT FROM DRAWINGS. *Expensive patterns, only infrequently used, are dispensed with in building this massive stator frame for vertical water wheel generator. Every unit shown here is of rolled steel construction, illustrating how extensively this modern fabrication method is used by electric manufacturers to reduce costs and expedite production.*

FOR *Special* JOBS

Another advantage made possible by Rolled Steel Design

ESSENTIALLY, rolled steel design is very simple.

It is merely the modern method of lightening heavy metal structures — machine frames, beds, bases, supports, housings, wheels, drums, cases, etc.— by building them up from individual parts, flame-cut from simple rolled steel shapes and then welded into one strong homogeneous unit.

In many cases, rolled steel design will eliminate the need for castings. In other cases, rolled steel combined with castings at strategic locations will be the best solution.

Ten important advantages of rolled steel design are listed in the panel below. Most important of all these is the fact that rolled steel design enables you *to pick special steels for special jobs.* It opens the door to the entire range of modern metallurgy's special analysis steels. It provides you with special properties where you need them to overcome nature's many destructive forces. For example:

To carry tremendous bearing pressures safely, there are several special analyses of USS Carilloy Alloy Steels.

To provide high impact strength at low temperatures, there is USS Steel for Low Temperature Service.

To reduce abrasive wear and cut down replacements, there is USS Abrasion-Resisting Steel.

To endure temperatures disastrous to other metals, there is USS Heat-Resisting Steel (25-12).

To carry high unit stresses and reduce weight to a minimum, there are USS High Tensile Steels.

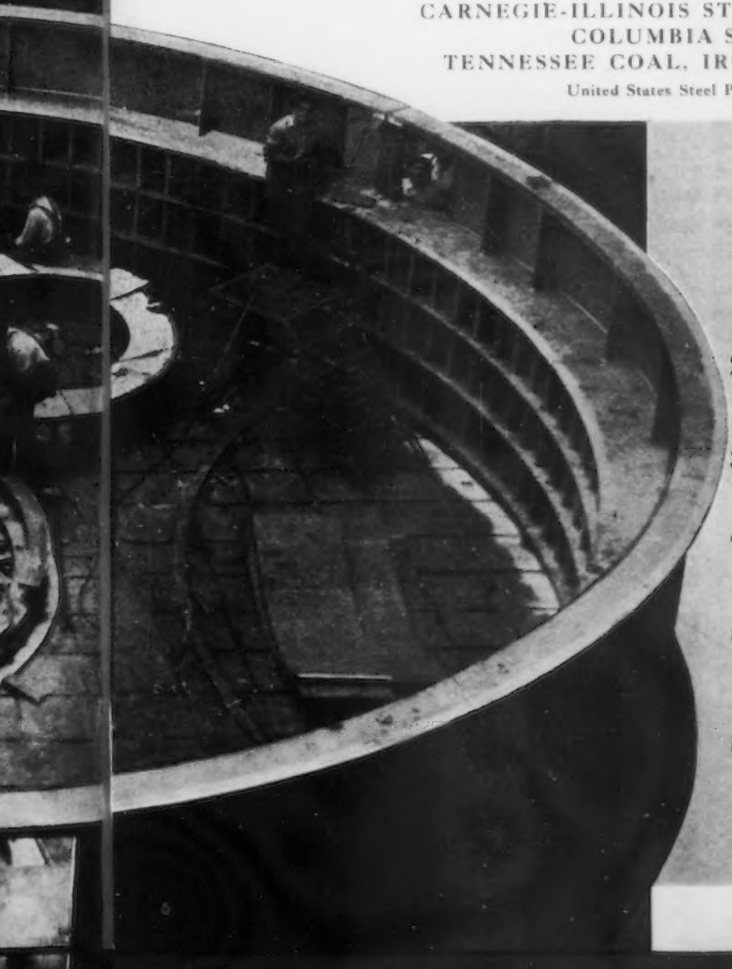
To resist corrosive environments, there are USS Stainless Steels in special analyses which can be welded with no loss in corrosion-resistance.

For virtually every special need, there are special rolled steels with special properties to make your equipment longer-lasting, safer and lighter.

Write us freely about any problem which you feel rolled steel design — or these special steels — might help you solve.

Our metallurgists have had wide experience in many fields. They will gladly work side by side with your own engineers . . . submit sound technical recommendations . . . solve these problems to your advantage.

CARNEGIE-ILLINOIS STEEL CORPORATION, *Pittsburgh and Chicago*
COLUMBIA STEEL COMPANY, *San Francisco*
TENNESSEE COAL, IRON & RAILROAD COMPANY, *Birmingham*
United States Steel Products Company, New York, *Export Distributors*

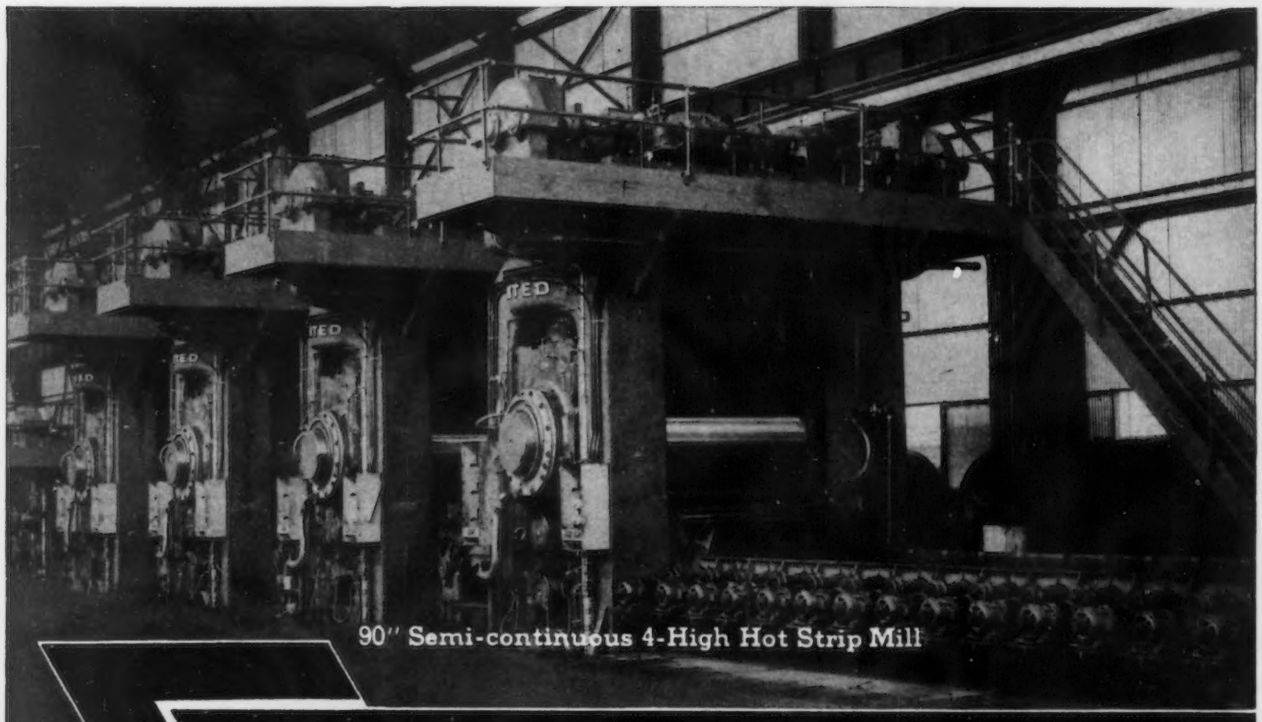


TEN IMPORTANT ADVANTAGES OF ROLLED STEEL DESIGN

1. **Rolled steel is highly uniform; it reduces the danger of blow holes, segregation, bad grain structure and internal stresses.**
2. **Rolled steel's physical properties are readily determined; once determined, they are constant and uniform throughout the metal.**
3. **Rolled steel is free from brittleness, possesses wide fatigue limits, is highly resistant to deformation.**
4. **Rolled steel design eliminates the costly pattern problem, the shrinkage problem, and the necessity of adapting designs for pattern draw and metal flow.**
5. **Rolled steel design trims off all excess weight, all metal not actually needed to carry stresses or provide rigidity. It often reduces dead weight by half and more.**
6. **Rolled steel design looks modern and is modern, eliminates useless ornamentation, employs straight lines and plane surfaces. It increases eye appeal and saleability.**
7. **Rolled steel permits machine design to be mobile and liquid; makes possible the quick incorporation of style changes, model changes and new improvements, without costly pattern write-offs.**
8. **Rolled Steel is available in many simple shapes—slabs, billets, plates, bars, pipe, tubing, forgings, structural sections, etc. —which simplify the cost and difficulties of fabrication.**
9. **In general, rolled steel design (economically combined with castings at strategic points) is the cheapest, strongest, safest, most eye-appealing method of machine construction.**
10. **IN ADDITION, and this is perhaps its most important advantage, it enables you to pick special steels for special purposes . . . to make full use of modern metallurgy's wide range of special-analysis steels.**

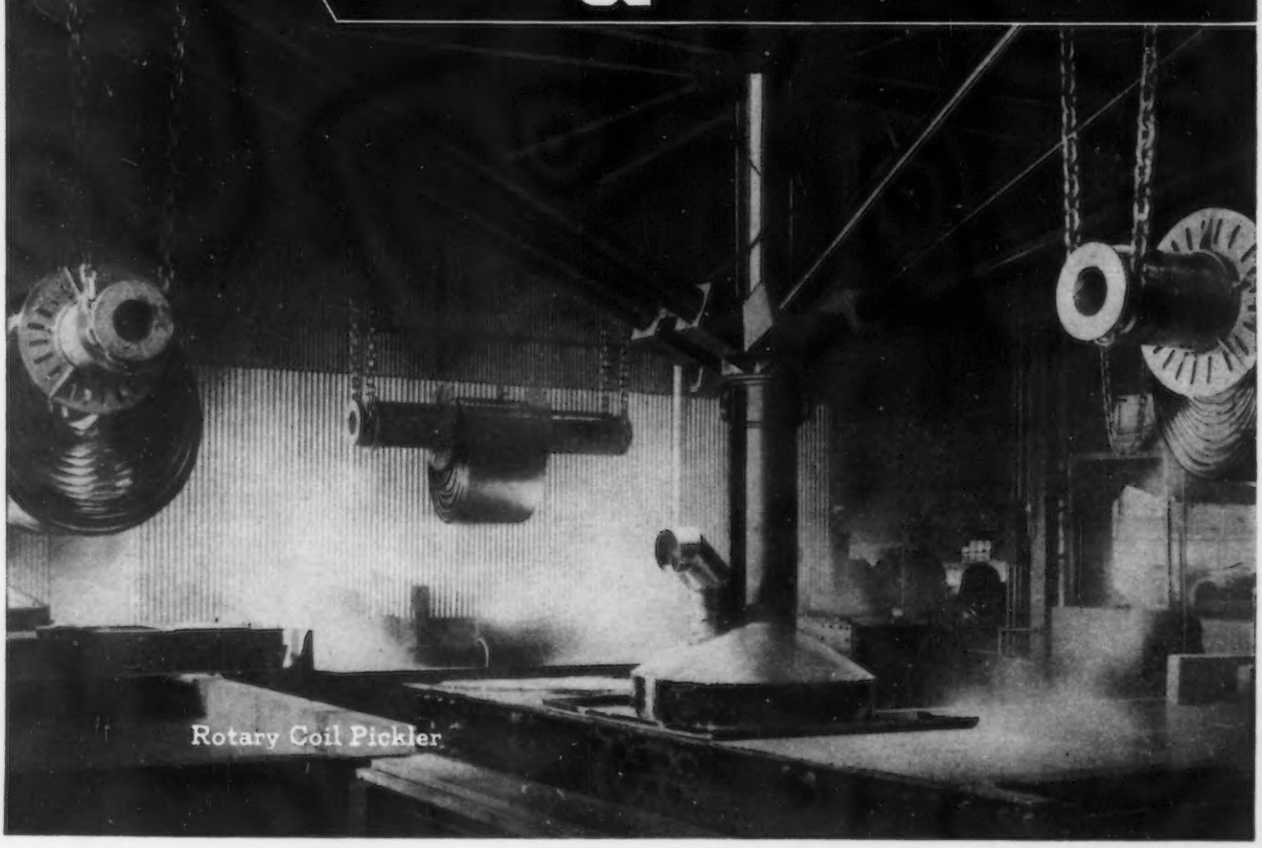
USS

UNITED STATES STEEL



90" Semi-continuous 4-High Hot Strip Mill

GRANITE CITY



Rotary Coil Pickler

Drum Type Hot
Flying Shear

48" 4-High Cold Reduction Reversing Mill

STEEL COMPANY MILLS

Designed and built by

UNITED

ENGINEERING *and* FOUNDRY COMPANY
PITTSBURGH — PENNSYLVANIA

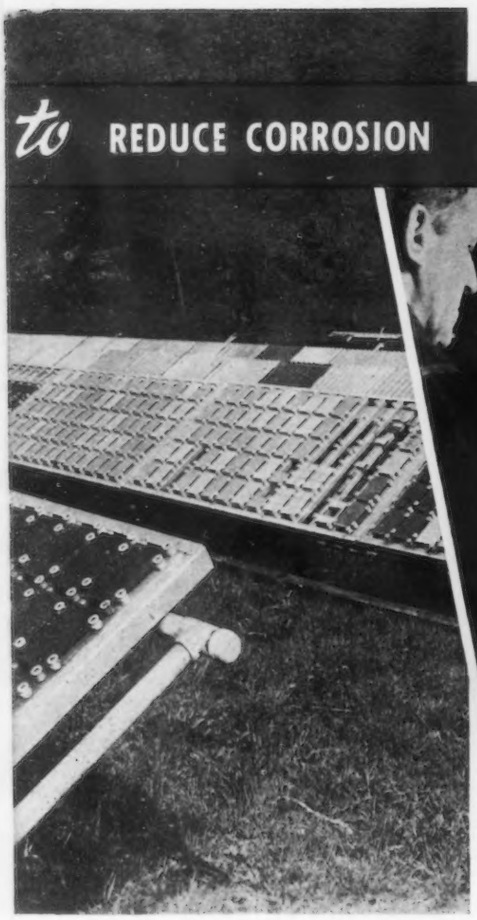
All Rolling Mill, Pickling and Shearing equipment designed and built complete by United.

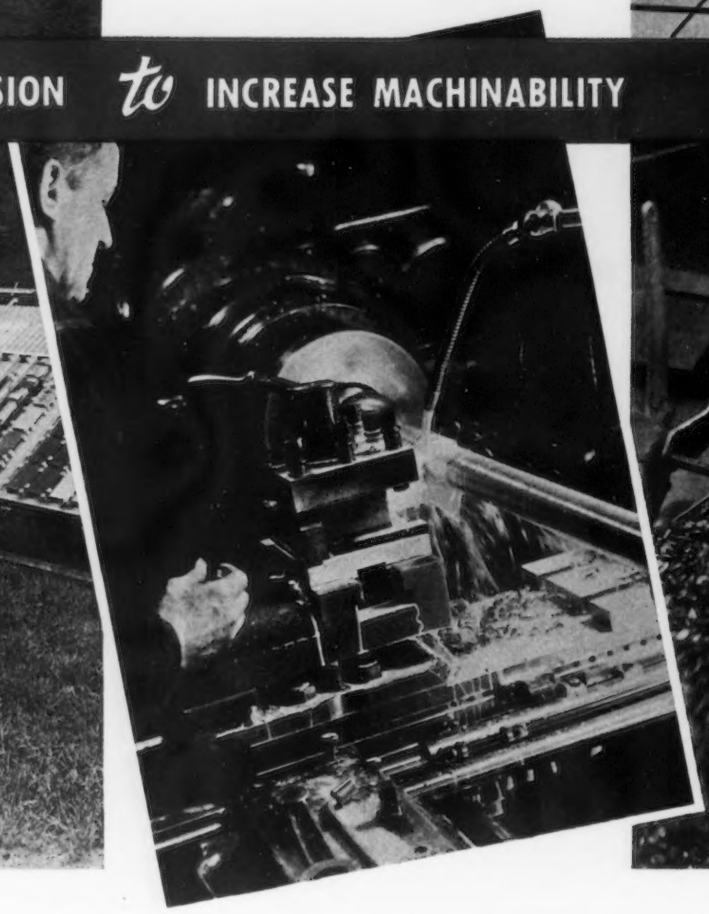
Tin Plate
Shearing Line

Associated Companies: DAVY and UNITED ENGINEERING CO., LTD. London, England; DOMINION ENGINEERING WORKS, LTD., Montreal, P.Q.

For these 6 objectives

to REDUCE CORROSION *to* INCREASE MACHINABILITY *to* RESIST WEAR





U·S·S COR-TEN

HIGHER PHYSICAL PROPERTIES and increased resistance to corrosion make it possible to use U·S·S COR-TEN in thinner sections without sacrifice of safety or service life.

In the development of U·S·S COR-TEN, more than 30,000 samples, comprising about 850 materials, were subjected to 145 different laboratory and field tests. These specimens were exposed in four locations in different sections of the country, to determine their relative merits under varying weather conditions, and in rural, industrial, and seacoast atmospheres. The results showed that in resistance to corrosion COR-TEN, under ordinary conditions, was much superior to any other steels tested, with the exception of the more costly high-chromium steels.

Representative samples of COR-TEN and other steels exposed to an industrial atmosphere for more than three years showed a life four to six times that of plain steel—many times that of other steels widely used.

U·S·S CONTROLLED STEEL

PRODUCING STEEL—in quantity—shipment after shipment, is *not* luck. It is expert steel-making as we apply it in our Controlled Steels—plain carbon steels for forging, forming, heat treatment, and machinery.

Marked "Confidential" in our files are dozens of stories of savings made possible by U·S·S Controlled Steel manufactured by Carnegie-Illinois Steel Corporation.

These records cover all phases of application—show where these steels have reduced machining costs in one plant—made forging quicker and cheaper in another—eliminated an entire phase of the heat-treating cycle in a third. In some cases savings have run into hundreds of thousands of dollars annually.

You, too, may have similar opportunities, may be using more expensive steels than necessary or steels which slightly changed in specifications would serve your purpose.

Our metallurgists will gladly come into your plant—and on your own machines show how savings can be made.

U·S·S ABRASION RESISTING STEEL

SOME NEW METALS can help you increase the life of your equipment. Other new metals can help you reduce its cost.

But it's a rare new alloy which can do both . . . at the same time. That's why U·S·S Abrasion Resisting Steel, manufactured by Carnegie-Illinois Steel Corporation, is so popular. Because, in many new applications, it not only lasts longer but also costs less than the alloy it replaces.

Being low in manganese (1.5 to 2.0%) it costs little more than plain carbon steel—yet actual case studies show that in its proper field of application, U·S·S Abrasion Resisting Steel often lasts longer than higher-cost alloys.

Wherever earth, sand, gravel, coal, waste, etc. flow over, through or against your equipment . . . that is the place to consider the use of U·S·S Abrasion Resisting Steel.

Look to the steel you are using and see if it is giving the service it should.

USS

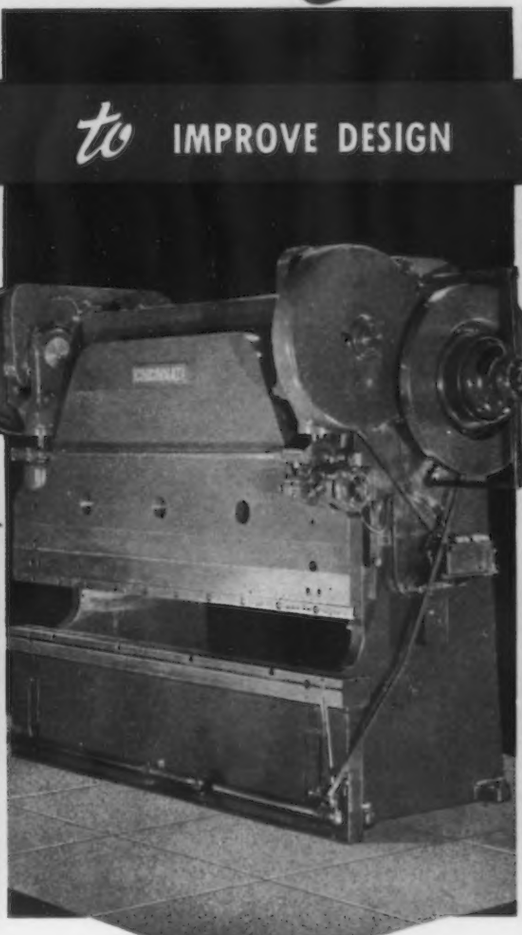
CARNEGIE-ILLINOIS STEEL CORPORATION, Pittsburgh and Chicago

COLUMBIA STEEL COMPANY, San Francisco

TENNESSEE COAL, IRON and RAILROAD COMPANY, Birmingham

United States Steel Products Company, New York, Export Distributors

U·S·S offers these 6 better Steels



to CUT COSTS

U·S·S CARILLOY ALLOY STEELS

FOR VITAL PARTS in equipment and structures—we offer U·S·S Carilloy Alloy Steel, manufactured by Carnegie-Illinois Steel Corporation.

You state your specifications — we'll supply a grade with the precise properties the job demands.

Matching the steel to the job is the one concern of the skilled metallurgists and technicians who man the special alloy plants of Carnegie-Illinois Steel Corporation.

In alloy steels physical properties depend on accurate composition and skillful heat treatment. Only delicate control of manufacture can produce consistently uniform properties. U·S·S Carilloy Alloy Steels have this precision. You can standardize on them with every assurance that you will secure the precise composition, the inherent characteristics, the response to heat treatment you specify . . . shipment after shipment.

to IMPROVE DESIGN

U·S·S ROLLED STEEL FOR WELDED CONSTRUCTION

ROLLED STEEL DESIGN for welded construction is merely the modern method of lightening heavy metal structures—machine frames, beds, bases, supports, housings, wheels, drums, cases, etc.—by building them up from individual parts, flame cut from simple rolled steel shapes and then welded into one strong homogeneous unit.

In many cases, rolled steel design will eliminate the need for castings. In other cases, rolled steel combined with castings at strategic locations will be desirable.

One of the chief advantages is the fact that *you can pick the steel to fit your job.* There are U·S·S special steels in a wide range to meet every condition including any of those described in this advertisement.

Write us fully about any problem which you feel rolled steel design—or these special steels—might help you solve. Our metallurgists will gladly work with you . . . submit sound technical recommendations.

to DECREASE WEIGHT

U·S·S HIGH TENSILE STEELS

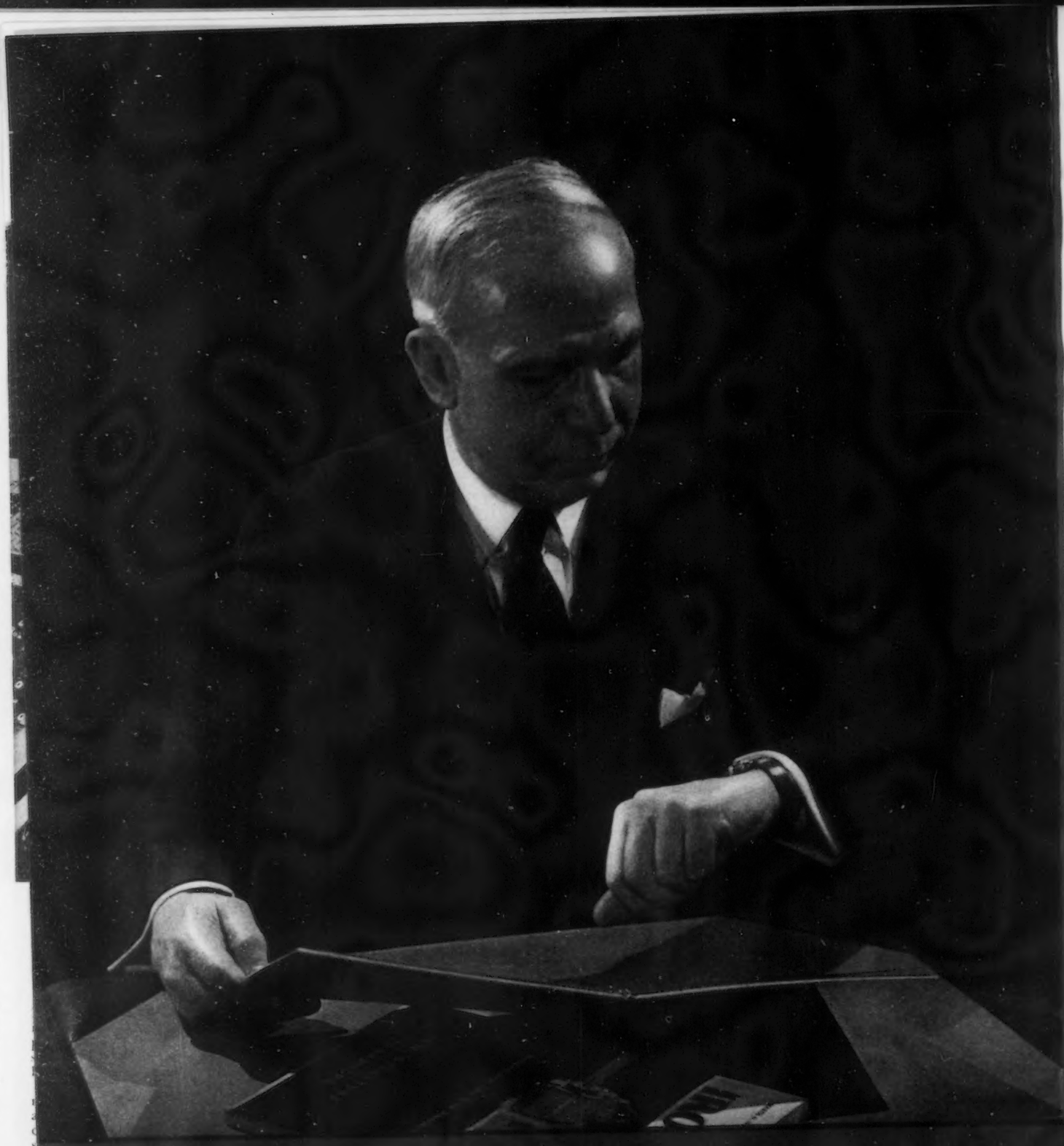
EXCESS WEIGHT costs you money every time you move it. It adds a costly load to your power plant, increases wear on parts—slows up operations — limits capacity — is a perpetual drag on earnings.

You can achieve structural lightness, safely, at low cost and with least change in shop methods by building with U·S·S COR-TEN and U·S·S MAN-TEN. These pioneer, low-alloy, low-cost high tensile steels are not only tougher and stronger, they are also more resistant to shock, stress, fatigue, abrasion and wear. They fabricate readily.

Whatever your equipment, if it is built of standard structural steel, why not find out how much dead weight you can get rid of. Our engineers will be glad to assist you in every phase of your work.

What these steels have effected in savings and improvements is a matter of record which we will be glad to place before you.

UNITED STATES STEEL



THERE IS Still Time

There is still time—

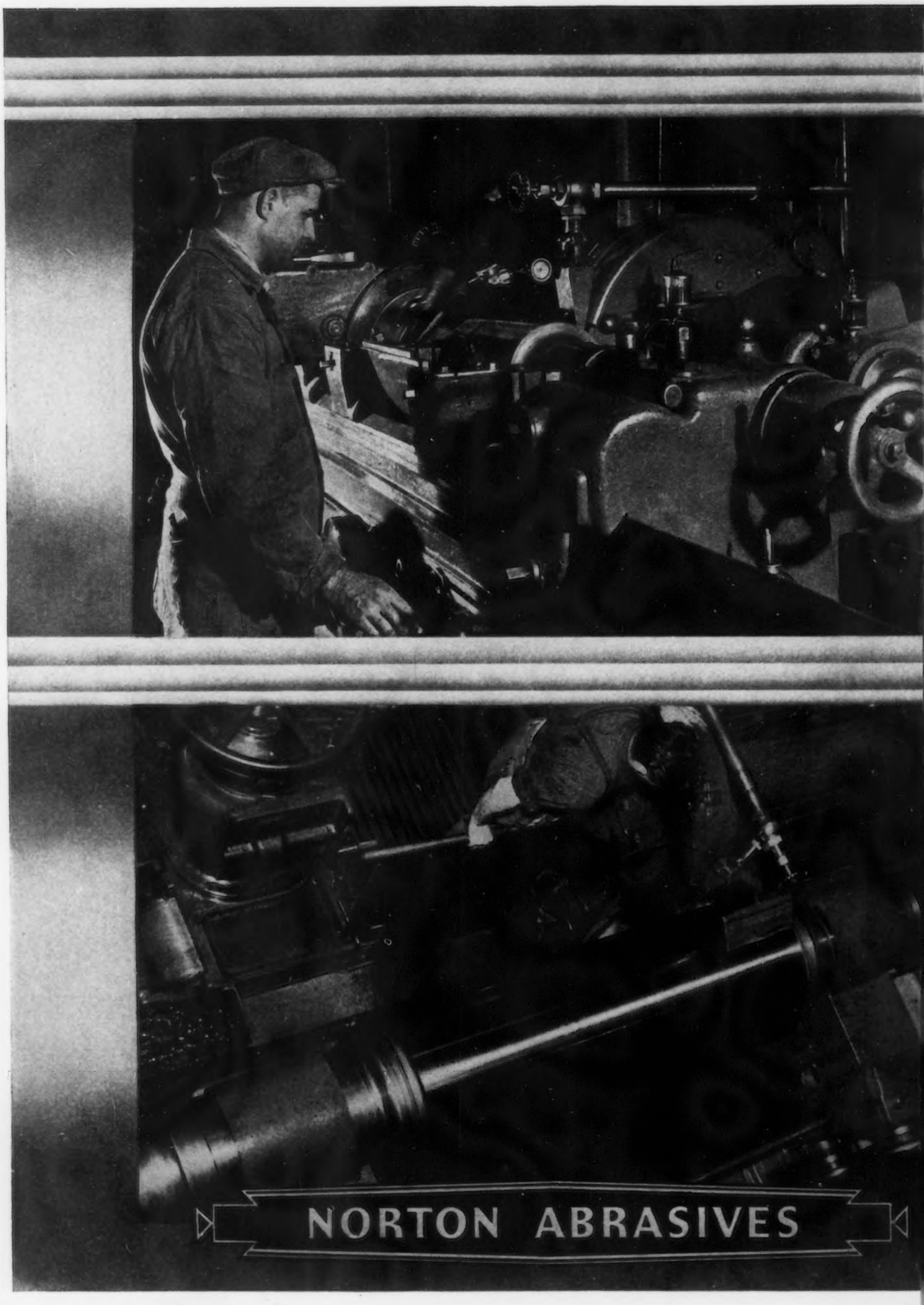
to place your selling message before buyers in the metal working industry, through The Iron Age Annual Review Number. But you must act promptly.

Here are the technical sections in which advertising will be placed along with editorial articles dealing with these subjects:

METALS
MACHINE TOOLS
SMALL TOOLS AND GAGES
FORMING AND FORGING
PRESSES AND SHEET METAL MACHINERY
POWER TRANSMISSION
MATERIALS HANDLING
STEEL MILL EQUIPMENT
HEAT TREATING FURNACES & REFRACTORIES
WELDING AND FABRICATING
PARTS
METAL CLEANING AND FINISHING
PLANT EQUIPMENT
FOUNDRY EQUIPMENT AND SUPPLIES
TESTING AND INSPECTION

Pick the section in which you wish your announcement to appear and wire or phone your space reservation. Copy and cuts should follow immediately. Forms close Dec. 18.

THE IRON AGE
ANNUAL REVIEW NUMBER
January 6, 1938


NORTON ABRASIVES

In the Steel Mills of Ford Motor Company

NORTON WHEELS for Roll Grinding

Efficiency—the Ford keynote. The Ford steel mills are no exception. Norton Roll Grinding Wheels play an important part in maintaining rolls at the quality demanded by Ford standards.

It is the variety of Norton abrasives and bonds, grains, grades and structures that make it possible to meet the individual requirements of each roll grinding job.

NORTON COMPANY, WORCESTER, MASS.

W-624

BETH-CU-LOY PIPE

200 to 300 per cent the resistance to rust

at only slightly greater cost

YOU can install Beth-Cu-Loy Pipe with complete confidence in its resistance to atmospheric corrosion. It is made of copper-bearing steel—steel alloyed with the small but exactly correct amount of copper for maximum resistance to rust. Various tests, including the well-known A. S. T. M. atmospheric-corrosion tests, have definitely established that copper-bearing steel of this analysis is the outstanding material among commercial irons and steels for defying atmospheric corrosion.

Beth-Cu-Loy costs very little more than ordinary pipe—actually less than most "premium" grades. Yet it is rust-resistant to a high degree. Use it where you want maximum service life.

BETHLEHEM STEEL

BETHLEHEM STEEL COMPANY

Say PRODUCTION MAN AND CUSTOMER

EVERYONE appreciates the many advantages of a *good* porcelain enamel finish. Easier sales and greater profits are the natural results.

And the way to be sure of an excellent finish is to use a base metal of ARMCO Ingot Iron. This "world's standard enameling iron" has full approval of experienced enamelers and your customers.

Men responsible for production like it because it comes to them clean, ductile, uniform in every quality. What's more, it has a scientifically processed surface that insures strong adhesion. ARMCO Enameling Iron can be worked, formed, drawn and spun with surprising ease. They can depend upon the finished work, skilfully enameled, being true to design, and free from surface imperfections.

Your customers also give it ready approval. Their confidence in ARMCO Ingot Iron is the result of over twenty-three years of national advertising. When your products carry the famous ARMCO Triangle trademark to the point of sale they are accepted without question.

That's why we say it will profit you to make the finish porcelain enamel on ARMCO Ingot Iron. A request to us will bring full information. The American Rolling Mill Company, Executive Offices, 1960 Curtis Street, Middletown, Ohio. District Sales offices are located in all principal cities.

PORCELAIN ENAMEL ON ARMCO INGOT IRON

Armco Enameling Iron

"O.K., BILL, ONE MORE G-E PUSH BUTTON INSTALLED

Now There Won't Be Any More Holdups for a Long Time"

"YOU'LL be as glad as I am that the Boss is specifying General Electric push-button stations now. They won't be tying you up and costing you time for repairs. And their silver contacts mean a lot less maintenance—they roll closed, and clean themselves automatically every time they are used."

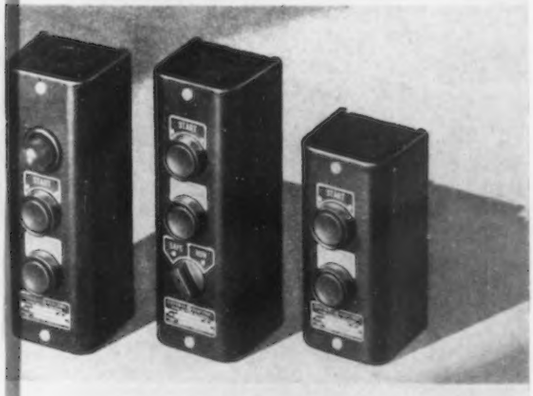
Installers and maintenance men who work with electric equipment all the time learn the big differences in push-button stations. That's why they are outspoken in their preference for G-E equipment. They say it makes their job far easier.

Foremen and managers also are enthusiastic about our line of push-button stations. It furnishes them a choice of station exactly suited to their needs. The attractive enclosures and sturdy mechanical and electrical design mean better-looking jobs, long life, and fewer maintenance calls.

We shall be glad to send you copies of our publications on all types of push-button stations. Just clip and mail the coupon to General Electric, Dept. 6B-201, Schenectady, New York.

GENERAL ELECTRIC

HREE TYPICAL MEMBERS OF A COMPLETE LINE



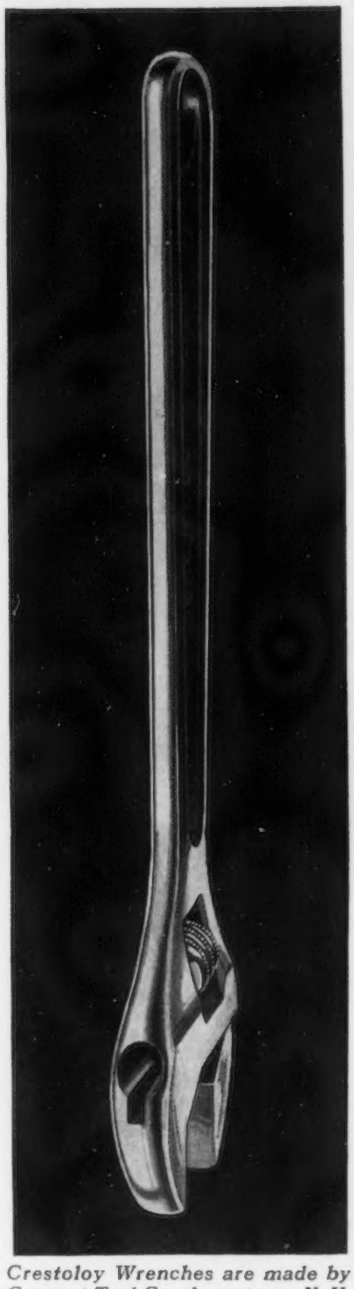
Please send me further information on the complete line of General Electric push button stations.

Name .....

Address .....

..... 080-132

UP IN THE *Stratosphere*...DOWN AT THE *South Pole*



Crestoloy Wrenches are made by Crescent Tool Co., Jamestown, N. Y.

...are *30%* thinner...*200%* stronger...they're VANADIUM STEEL

You can get a Crestoloy wrench into tight places where an ordinary wrench would not go — because Crestoloys are 30% thinner than ordinary wrenches. A Crestoloy wrench will stand up in any service to which wrenches can be subjected—because it is 200% stronger than a wrench of the conventional type. Such are the quality and reputation of the Crestoloy wrench that Crestoloys were part of the equipment of the Byrd Expedition to the South Pole and Captain Stephens' Stratosphere flight.

All Crestoloy Wrenches are made of Chromium-Vanadium Steel, selected for its high strength, toughness and resistance to fatigue.

Metallurgists of the Vanadium Corporation of America will be glad to work with you in the selection or development of a steel that will enable you to build greater strength and dependability into your product. A request for information or for metallurgical assistance involves no obligation.

VANADIUM CORPORATION OF AMERICA

420 LEXINGTON AVENUE, NEW YORK, N. Y.
Plants at Bridgeville, Pa., and Niagara Falls, N. Y.
Research and Development Labs. at Bridgeville, Pa.

Vanadium *Steels*

FOR STRENGTH · TOUGHNESS · DURABILITY

METALS VANCORAM ALLOYS

FERRO ALLOYS
of vanadium, silicon, chromium, and titanium, produced by the Vanadium Corporation of America, are used by steel makers in the production of high-quality steels.

THE CARBORUNDUM COMPANY • NIAGARA FALLS, N.Y.

REG. U. S. PAT. OFF.

Sales Offices and Warehouses in New York, Chicago, Philadelphia, Detroit, Cleveland, Boston, Pittsburgh, Cincinnati, Grand Rapids

(Carborundum is a registered trade-mark of The Carborundum Company)

Little BRIDGES PLAY *Big* PARTS, TOO!

Ch. Engr., N. L. Smith, Maryland State Roads Comm., Gen. Contractors, P. Reddington & Sons

H. H. Kranz, Engr. of Highways, Cincinnati, O.; Gen. Contractors, Kerpen Construction Co.

Built by Erie R. R. Co., C. S. Fanning, Ch. Engr.; F. A. Howard, Engr. of Structures.

MODERN grade separation projects show the trend to simplified, efficient lines—to strong, low-cost construction. They indicate the decrease in below-deck depth to maintain required clearances with a minimum amount of approach fill or excavation. Built of steel, they assure sturdiness and long service. The successful adaptability to esthetic treatment harmonizes a practical utility to its surroundings.

Illustrated are three types of grade crossings recently fabricated by American Bridge. The Rockville, Md., span (above) typifies the distinctive, graceful appearance of the tied arch. The pleasing, vaulted profile of the continuous, rigid frame marks the lines of Cincinnati's McMillan Street Bridge (middle). The Big Tree, N. J. railroad crossing (bottom) shows an harmonious adaptation of the efficient plate-girder span.

Little bridges play big parts, too, in American Bridge Company's history. The same care, the same service, the same half-century of experience are available to you whether your projected bridge is large or small.

AMERICAN BRIDGE COMPANY

General Offices: Frick Building, Pittsburgh, Pa.

Baltimore Boston Chicago Cincinnati Cleveland Denver Detroit Duluth
Minneapolis New York Philadelphia St. Louis

Columbia Steel Company, San Francisco, *Pacific Coast Distributors* • United States Steel Products Company, New York, *Export Distributors*

UNITED STATES STEEL

ZIRCONIUM added to Steel in the Ladle

. . . Inhibits Carbon Segregation

ZIRCONIUM added to killed steel in the ladle diminishes the variation in carbon content within the ingot. This variation, known as "segregation", results in non-uniform physical properties. Zirconium, by inhibiting carbon segregation, produces more uniform grain structure and properties throughout the ingot.

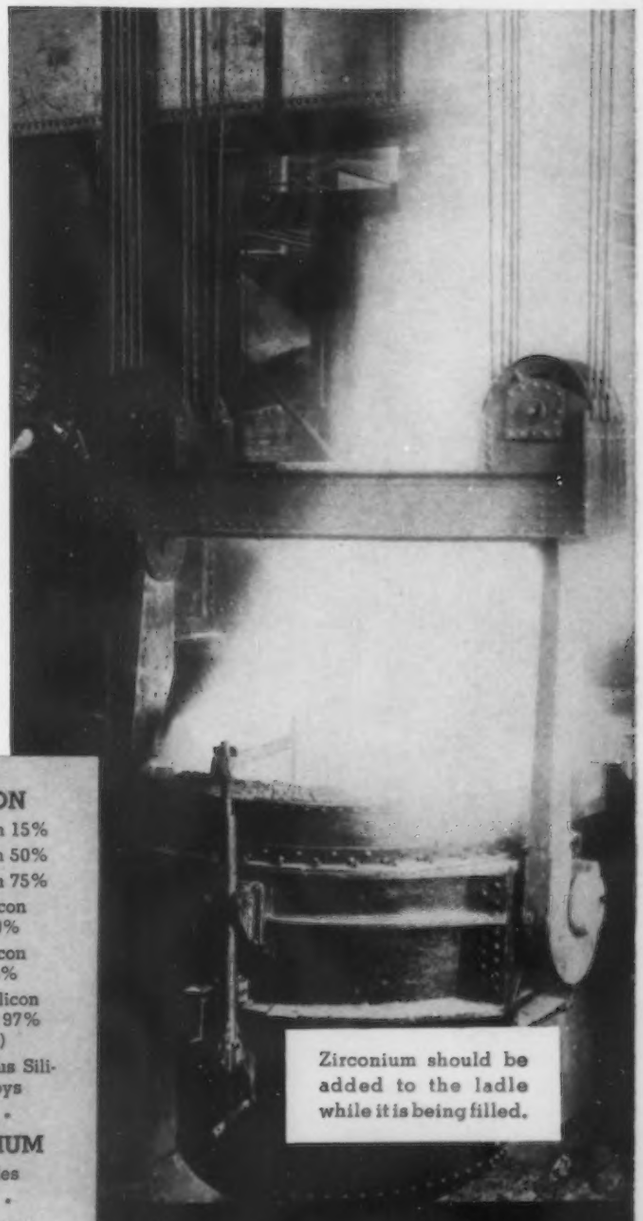
Zirconium is advantageously added to killed steel in the ladle as 12-15 per cent zirconium alloy. Ask an Electromet metallurgist to call and explain how you can use this alloy to improve your killed-steel ingots . . . Or write for additional information, without obligation.

ELECTRO METALLURGICAL COMPANY

Unit of Union Carbide and Carbon Corporation

UCC

Carbide and Carbon Building, 30 East 42nd St., New York



CHROMIUM
Low-Carbon Ferrochrome (in grades, maximum 0.06% to maximum 2.00% carbon)
High-Carbon Ferrochrome (maximum 6.00% carbon)
High-Nitrogen Ferrochrome
Chromium Metal
Chromium-Copper
Miscellaneous Chromium Alloys

CALCIUM
Calcium-Silicon
Calcium-Aluminum-Silicon
Calcium-Manganese-Silicon

ZIRCONIUM
12 to 15% Zirconium
35 to 40% Zirconium
Aluminum-Zirconium

SILICO-MANGANESE
All grades including Silico-Spiegel

MANGANESE
Standard Ferromanganese 78 to 82%
Low-Carbon Ferromanganese
Medium-Carbon Ferromanganese
Spiegeleisen
Manganese Metal
Manganese-Copper
Miscellaneous Manganese Alloys

PRODUCTS OF A UNIT OF UCC UNION CARBIDE AND CARBON CORPORATION

SILICON
Ferrosilicon 15%
Ferrosilicon 50%
Ferrosilicon 75%
Ferrosilicon 80 to 90%
Ferrosilicon 90 to 95%
Refined Silicon (minimum 97% silicon)
Miscellaneous Silicon Alloys

VANADIUM
All grades

BRIQUETS
(Patented)
Chrome Briquets
Manganese Briquets
Silicon Briquets

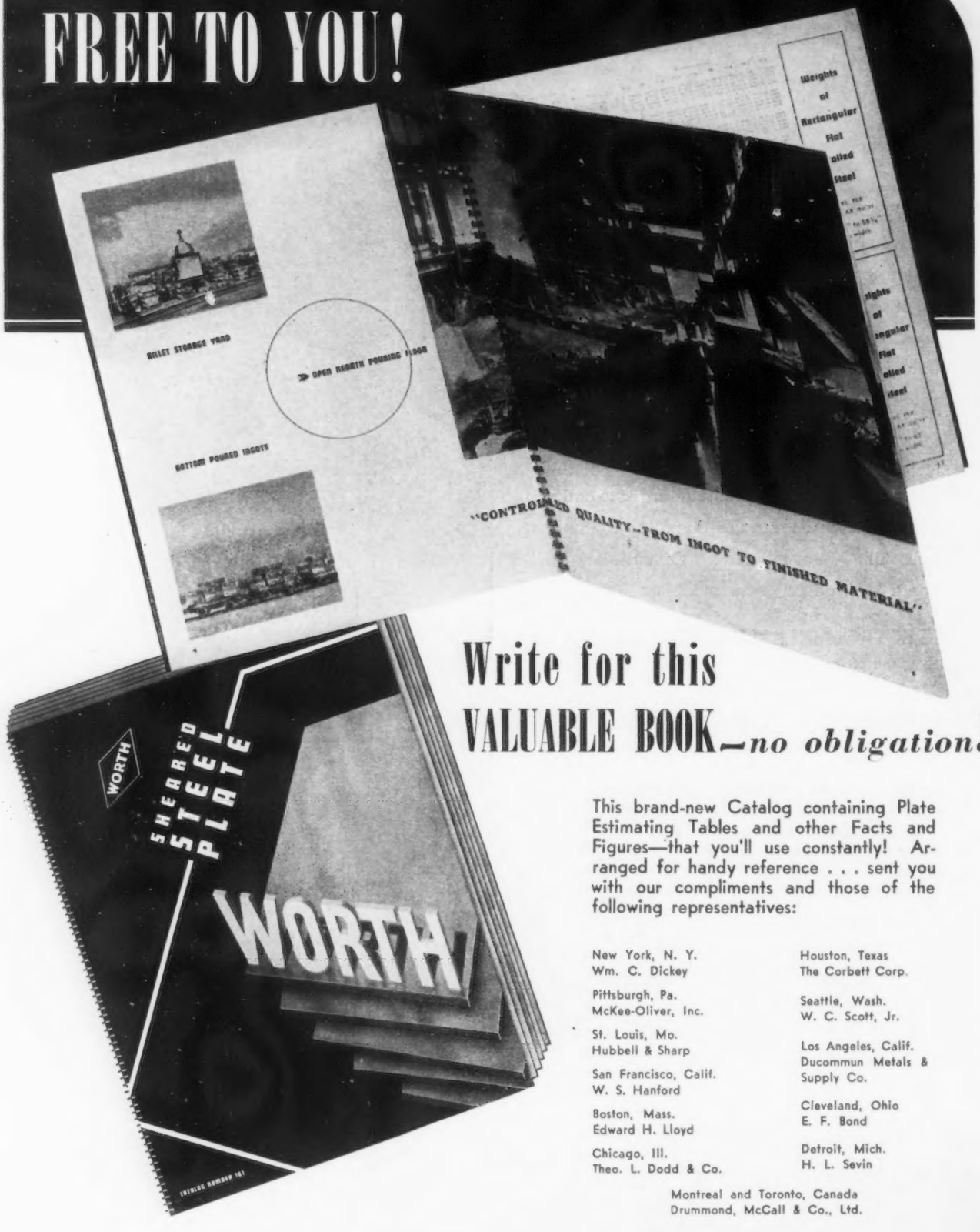
COLUMBIUM

TUNGSTEN

Electromet
Ferro-Alloys & Metals

Visit the **STAINLESS STEEL EXHIBIT**
New York Museum of Science and Industry, R-C-A Building, Rockefeller Center, New York

FREE TO YOU!



Write for this VALUABLE BOOK—*no obligation!*

This brand-new Catalog containing Plate Estimating Tables and other Facts and Figures—that you'll use constantly! Arranged for handy reference . . . sent you with our compliments and those of the following representatives:

New York, N. Y.
Wm. C. Dickey

Pittsburgh, Pa.
McKee-Oliver, Inc.

St. Louis, Mo.
Hubbell & Sharp

San Francisco, Calif.
W. S. Hanford

Boston, Mass.
Edward H. Lloyd

Chicago, Ill.
Theo. L. Dodd & Co.

Houston, Texas
The Corbett Corp.

Seattle, Wash.
W. C. Scott, Jr.

Los Angeles, Calif.
Ducommun Metals & Supply Co.

Cleveland, Ohio
E. F. Bond

Detroit, Mich.
H. L. Sevin

Montreal and Toronto, Canada
Drummond, McCall & Co., Ltd.

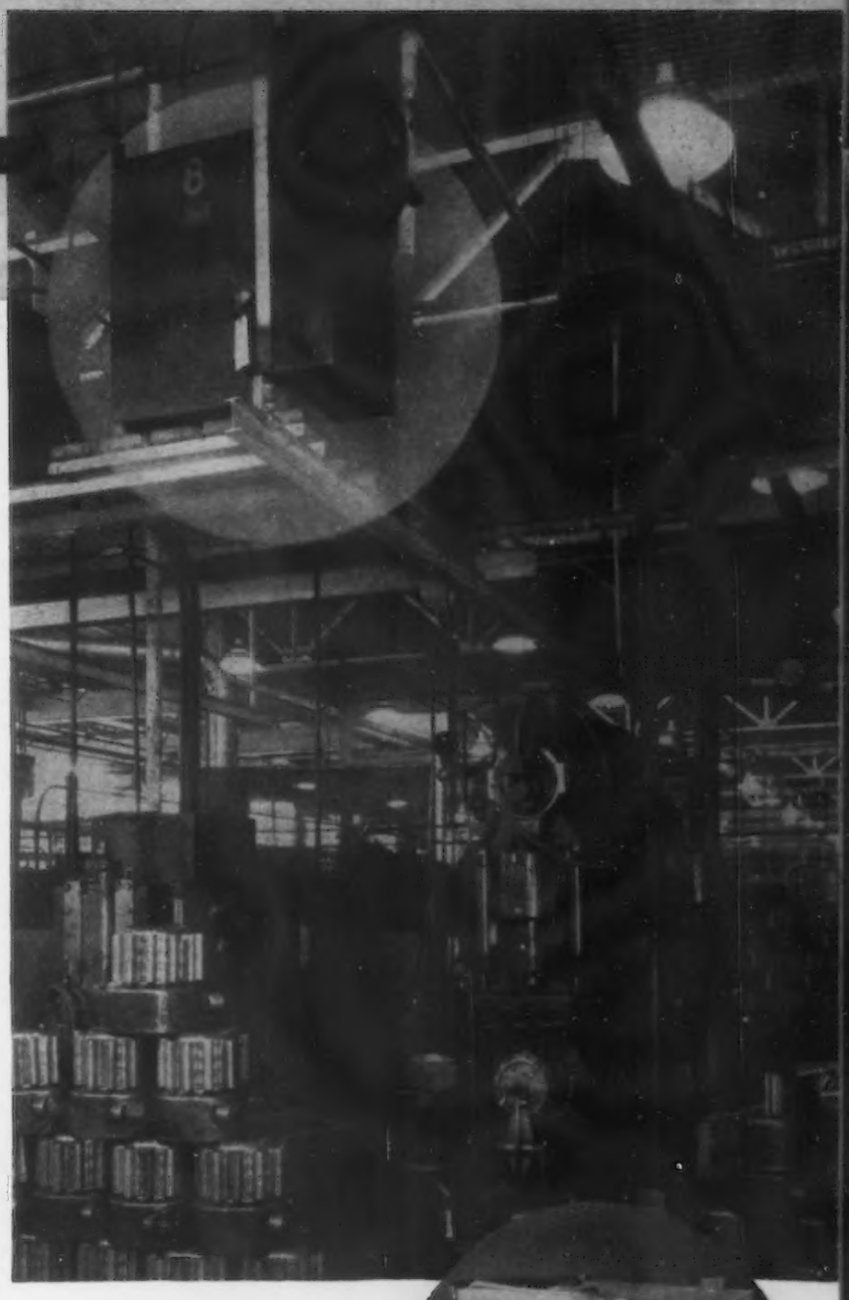
WORTH STEEL COMPANY · CLAYMONT · DEL.

UT QUALITY WELDING ON A PRODUCTION BASIS

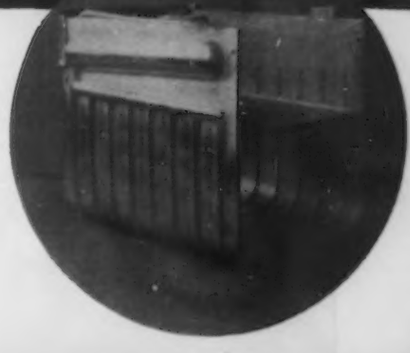
with Vestinghouse Ignitron plit-second Control

Velds of split-second duration now can be pplied with unvarying accuracy in timing nd current, if regulated by Westinghouse gnitron Welding Controls. Such precise conrol brings *faster* welding, and *fewer* rejects ue to discoloration, burning, warping, and ther costly imperfections. In many cases, re-grinding is unnecessary, and finish-grindng time and expense can be substantially educed. For increased production and better uality, improve your present welders by dding Westinghouse Ignitron Controls—and lways specify them for new equipment.

f you would like to employ inexpensive esistance welding to replace costly fabrication ethods, ask Westinghouse for complete data n Ignitron Welding Controls. J 20453



Ignitron Welding Control on an automatically indexing projection welder used for fabricating Westinghouse refrigerator parts. Notice remote mounting of Ignitron Timer near ceiling to save floor space.



This seam welded refrigerator evaporator is an example of how Ignitron Controls have improved production of liquid and gas-tight welds.

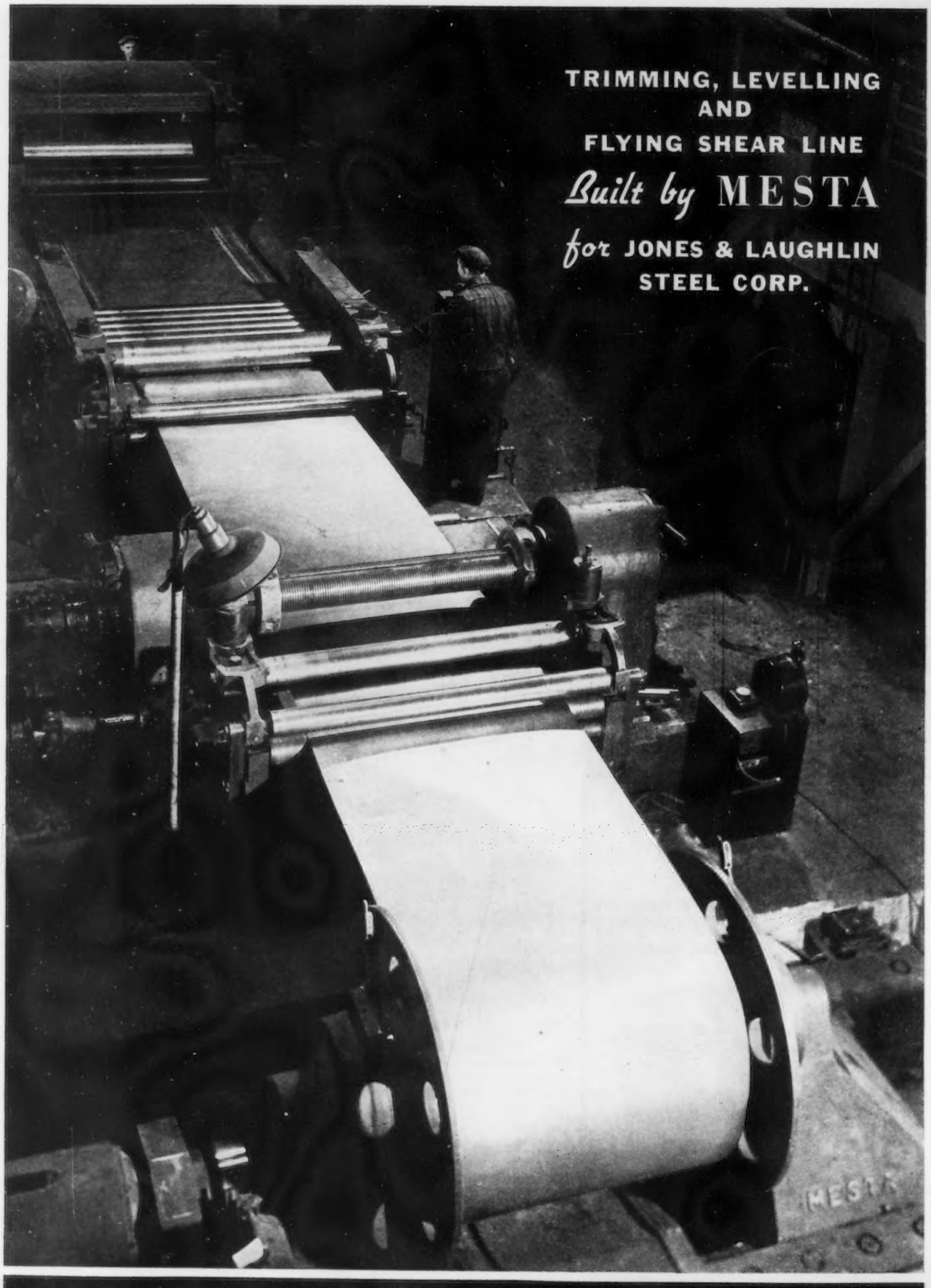
DO YOU USE RESISTANCE WELDING

for

ALLOYS	NICKEL
ALUMINUM	STEEL
BRASS	STAINLESS STEEL
COPPER	TUNGSTEN

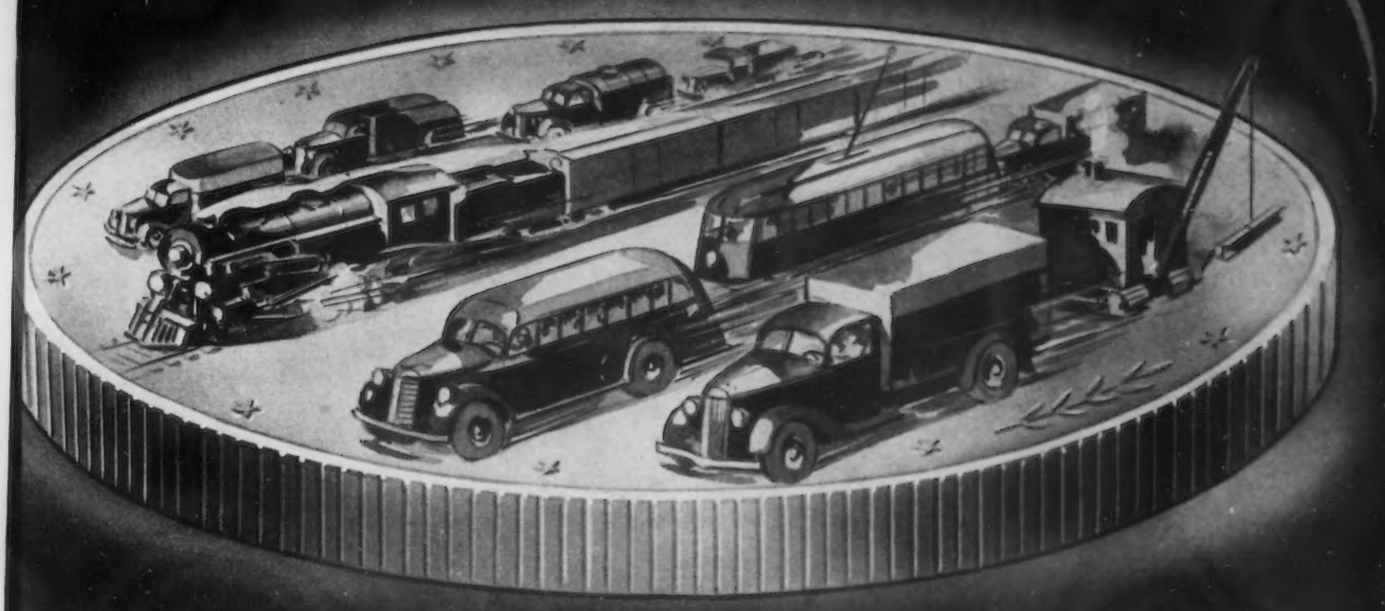
or combinations of these metals? If so, it will pay you to investigate Ignitron Welding Controls. Write today for booklet B2123. Westinghouse Electric & Manufacturing Company, East Pittsburgh, Pa.

Westinghouse *Ignitron Control* for RESISTANCE WELDING



MESTA MACHINE COMPANY, PITTSBURGH, PA.

You Can Move Anything FARTHER On A Dollar



When the Pay Load Is Increased *BY INLAND HI-STEEL*

● Inland Hi-Steel was developed for the equipment manufacturer who wants to make *mobility* and *low operating costs* important sales features of his product.

With Inland Hi-Steel he can greatly reduce structural weight without loss of strength . . . and this open hearth alloy also has much greater resistance to atmospheric corrosion even than copper bearing steel.

These advantages can now be added to his product at very small cost, for his tonnage consumption of steel is reduced and his fabrication costs are not materially increased.

Daily savings in operating costs reach big totals for the user.

Not only does Inland Hi-Steel make the equipment more *mobile* and *profitable* in his hands, but it also makes sales move faster for the manufacturer who anticipates these customer-advantages and builds from an operating viewpoint with Inland Hi-Steel.

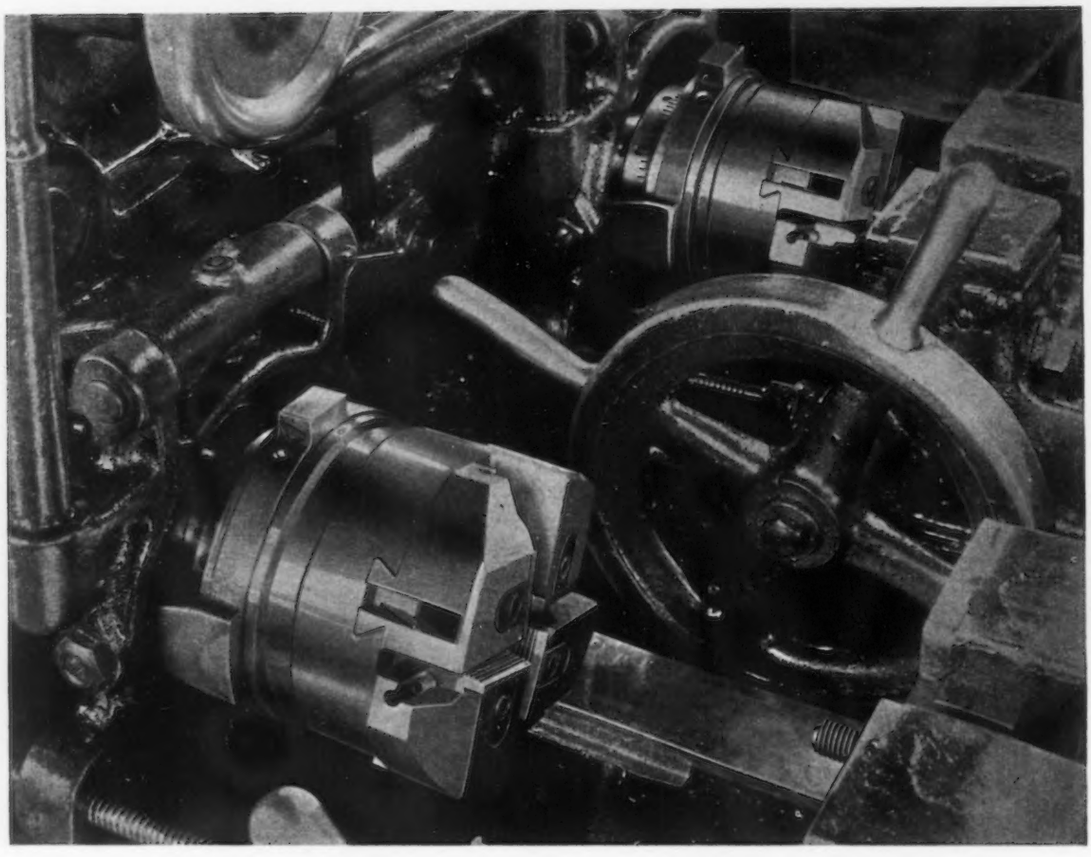
Send for Bulletin No. 10 which fully describes Inland's low alloy, high strength Product

SHEETS STRIP TIN PLATE BARS RAILS TRACK ACCESSORIES PLATES FLOOR PLATES STRUCTURALS PILING REINFORCING BARS

INLAND STEEL CO.

General Offices: 38 South Dearborn Street, Chicago, Illinois • Offices in: Detroit-Kansas City-Milwaukee-St. Louis-St. Paul

Why *Sacrifice* Quality For Quantity
Use LANCO Die Heads and Combine Both



The Brown Corporation, Syracuse, N. Y., employ LANCO Die Heads for threading Diesel Engine studs made of Chrome Nickel Steel.

Quality: Threads are held within a .002" limit on pitch diameter.

Quantity: An average of 200 studs are completed per hour.

The sturdy precision construction of LANCO Die Heads assures the accuracy that you may require for your threaded products and the LANDIS patented Tangential Chaser permits the higher threading speeds that guarantee modern production standards will be maintained.

LANCO Die Heads are essential for close tolerances on production threading operations. May we send you more details?

LANDIS MACHINE CO., Inc.
Waynesboro, Penna.

THE IRON AGE

Contents

DECEMBER 16, 1937

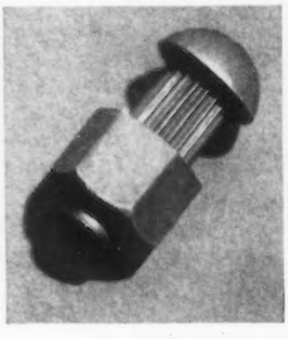
Special Bolts a Specialty

BOLTS for hammering loads, bolts for constant stress—temporary bolts, permanent bolts, and bolts which must be removed from time to time. Bolts which serve under high temperatures, bolts which must fight salt-water corrosion. Large bolts and small bolts; machine, carriage, and lag bolts; hanger, plow, stud, and tap bolts; bolts of carbon steel and bolts of alloy steel, heat-treated or untreated. Bolts which can be ordered months in advance—bolts which are needed day after tomorrow. However varied the demands may be, Bethlehem is in an exceptionally favorable position to meet your requirements. When special materials are needed Bethlehem's bolt and nut division can draw on the metallurgical experience of an organization making virtually all forms of steel for all industries. Our warehouse at Lebanon, Pa., is stocked with 3500 different headed and threaded products ready for immediate shipment. Some special Bethlehem fastenings are described below.

SOME LEADERS

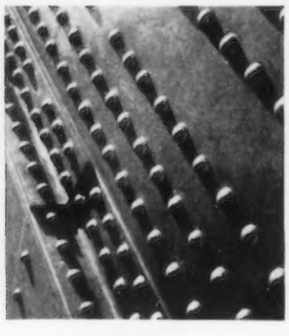
For highest temperatures

Supertemp, a patented alloy steel, is the material for bolts, studs, and pressure screws to hold at working temperatures of 1000 deg. F. and even higher. S.A.E. 4140 and Mayari for less severe temperatures. Other materials made on order. Also three types of nuts for high-temperature work.



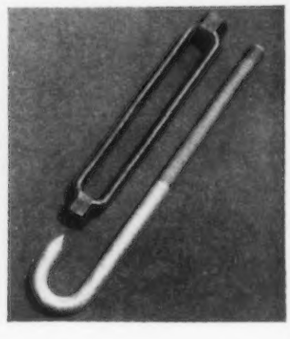
Dardelet Rivet Bolt

Holds like a rivet; as easy to use as an ordinary bolt. Standard rivet head. Driven in with a hammer; ribbed shank provides a tight fit. Self-locking thread on bolt and nut insures a connection that cannot vibrate or work loose. The Dardelet thread can also be obtained on track bolts and machine bolts.



Rivets for high-tensile steel

The new high-tensile low-alloy steels call for rivets with increased strength. Bethlehem's new Mayari R—having high tensile strength and corrosion resistance of six times that of ordinary structural steel—is now being made into rivets. Material is identical to that in plates, sheets, and structural shapes.



Special shapes

Square-body machine bolts, U-bolts, gate hooks, and pressure screws are only a few of the special bolt products which Bethlehem's Lebanon Plant is equipped to make. Clevises, turnbuckles, boiler-patch bolts are others. Staybolts of wrought iron or Mayari staybolt steel. Washers, insulator pins.

BETHLEHEM STEEL COMPANY

BETHLEHEM STEEL

▲ ▲ ▲ THE IRON AGE ▲ ▲ ▲

December 16, 1937

ESTABLISHED 1855 Vol. 140, No. 25

Break the Stick!

CONGRESS has been in session now for five weeks. During this time we have heard a good deal from Washington and elsewhere about the need of reassuring business as to the Government attitude toward it.

Promises have been made regarding the future modification of tax laws and other measures and attitudes, "when we can get around to it," but these expressions of good intentions had little effect on the downward course of business. That may be because as far as anything concrete is concerned to prove the intent, it has not materialized. Can it be that business is getting skeptical about promises?

It reminds one of the chicken farmer who had modern ideas about egg production. The old fashioned notion, of course, has always been to treat the hens well and make them as comfortable as possible. This new era farmer had a different theory. He believed in keeping the hens "all stirred up." "Think of all the time that is wasted in soulful contemplation by hens while sitting on their nests. I shall put a stop to this, show them who is boss around here and make them lay their eggs on the run."

Whereupon this progressive farmer provided himself and his children with a variety of stout sticks. Whenever the flock of hens was making itself comfortable, it would be approached by the farmer or one of the family and be belabored into action.

No doubt exercise was good for the farmer and his family and gave them an appetite, but the hens did not seem to benefit by it. In fact, the production of eggs dwindled so seriously that the farmer finally decided to approach his hens with an olive branch instead of a hickory stick.

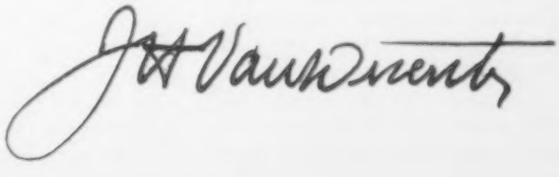
"My dear hens," said the farmer, "we need your eggs so the family can continue to eat. Believe me, I have the best intentions toward you and will no longer belabor you with sticks."

"What have you got in your hand?" inquired a presumptuous hen.

"That," replied the farmer, "is an olive branch."

"Oh, yeah!" replied the hen, "it looks like just another stick to me."

The moral of this is that belabored hens lose the power to discriminate. If you want to convince them that you mean business, you must destroy the stick and then you won't need the olive branch.



How Do Your Wage Rates Compare With T

THE point system for evaluating jobs within an individual plant has been used for several years, as pointed out by Mr. Bass in THE IRON AGE of Sept. 10, 1936. Extension of its use by individual companies or by trade associations for its member companies, for accurately comparing rates with those of other companies in a given district or community, is outlined in this article.

o o o

"WHAT is the 'district' or 'community market' rate for our class of labor?" ask many operating executives. "How can district or community wage rate surveys be made more accurate and intelligible?" ask many others. Today with the determined and almost unprecedented upward movement in wage rates and with pressure from organized labor groups to increase wages still further, these questions become vitally important problems and problems requiring more attention than previously given them.

Granting, of course, that "going" rates do not and should not be the sole determinant of the internal wage policy, it still remains important that management have a clear picture of the status of its wage scale in relation to the district before decisions are made as to the adequacy of its existing scale of wages or the justification for its revision. Where a management has sold itself to labor as being equitable in its dealings, accurate wage comparisons with employers in their community can be a valuable instrument to use in collective bargaining on wage matters.

Perspective View Valuable to Management

Even beyond all this lies the fact that management should certainly know as much about the condition of district wages as does the labor organizer. Time was when labor knew little or nothing about wage rates outside, but today through the medium of the affiliated industrial unions, wages are being compared both by district and industry, and labor's perspective of outside wages has been considerably broadened.

A perspective view, therefore, of the magnitude and trend of community wages is valuable to management. Immediately the question arises as to how this information can best be collected and presented so as to obtain an accurate, intelligible picture. Even before this can be answered, however, there is another question that must be considered, namely, that of the fundamental wage policy adopted by the management, that is, the wage policy with reference to general outside wage levels. There are companies which have adopted the generous policy of paying as high or higher than the district for *any specific job or trade.* Others state that they will maintain their *general wage scale* as high or higher than the general district level. In short, the emphasis is placed in one case upon the specific job and in the other case upon the complete wage scale, and there is a very fundamental difference.

Specific Job or General Wage Scale?

The wisdom of the former policy might logically be questioned. In practice it assumes that the average of district rates on various jobs is in proper relative alinement, and this is generally not the case. As a result, the internal alinement of rates no longer remains a function of the local management. Control is shifted to outside managements employing labor on similar jobs. Moreover, the specific wage rates paid individual jobs may not reflect normal conditions within a concern, but rather just the converse. For these individual rates can reflect possible errors in judgment in establishing base rates; they can reflect a special condition where the employee is being paid a rate commensurate with his own ability rather than the job's requirements; and, they reflect conditions of unusually close or loose price setting by the time study department. These conditions when viewed collectively will affect the general level of wages only slight-

o o o

By A. W. BASS, Jr.
Job Analyst, The Atlantic Refining Co., Philadelphia.

o o o

th Those of Your Community?

Point System of Job Evaluation Can Aid Either Through Company or Association Studies

o o o

ly, but when viewed as wage rates for a specific job, they are seen out of proportion and may result in false assumptions.

The second policy appears the wiser, for then a management can maintain its wages in general at below, on, or above the market level, depending upon policy and competition within its own industry. A company can adopt some rational basis for justifying its internal rate differentials and keep the control of the wage structure to a large degree in its own hands.

Your Wage Scale vs. That of Other Companies

So, if this is the policy to be adopted, there still remains the problem of developing some method for determining the relation of an individual company's wage scale to those of other firms and to the district in general.

Some firms achieve this by selecting certain common representative jobs in their plant as "key" jobs, and on the basis of these make wage comparisons with other firms having jobs which are considered similar. Where this is done, the wage comparison is being made with the objective of determining the firm's relation to the general level of rates; for in reviewing the results of the survey, the emphasis is placed on its overall status, with respect to all jobs included, rather than on cases of individual jobs where rates appear either too high or too low.

While this method is quite acceptable in theory, it is not entirely satisfactory in practice. For a specific job in one company can rarely be found exactly duplicated in another, even within the same industry. As a result, the comparison is made between jobs which are apparently but not exactly similar. Another objection is that an industry may be in a labor district employing a relatively, if not totally, different type of labor which obviously renders a comparison of this nature not only difficult but often impossible. Still another objection is that the summary of this wage information cannot be put into such form as to give a concrete, simple, and crystallized picture of any company's actual wage scale relative to that of any others. And if the policy is to maintain the wage scale itself in a certain relation to district levels, a picture of what these wage scales actually are is quite desirable.

Point Method Extended to Wage Rate Comparisons

In the Sept. 10 and Oct. 8, 1936, issues of THE IRON AGE I described a point method for evaluating hourly paid jobs which was developed to justify and maintain the internal wage rate differentials on various jobs in proper alinement. While this was originally drawn up for the purpose stated, its use has been extended with considerable success to that of making wage rate comparisons. In brief, this job evaluation plan supplies an abstract point measurement to the difficulty or value of jobs, so that when applied to a wage scale, the actual rates paid will reflect the differences indicated by these point ratings.

In other words, rather than determining how much a job is worth by comparing it in toto with other jobs, this value is determined by comparing separately the skill, experience, and responsibility requirements with other jobs, and in each case assigning a point or index value. The total of these point values, therefore, indicates the intrinsic value of this job relative to any or all others.

Without the use of some sort of difficulty ratings expressed mathematically, it would be impossible to draw wage curves which could be accurately compared. For these

curves must be drawn against wages paid and job difficulty, and job difficulty is an abstraction until reduced to some common denominator such as points. To get an accurate picture of the actual wage scale in one company in such a form as to be directly comparable with any other, necessitates applying a job evaluation to their work.

Comparing With Other Plants

In practice this is accomplished by an actual visit to the company with which a wage comparison is to be made. There 40 or 50 jobs which the local management feels are in proper relative alinement and which cover the total range of wage rates are studied and evaluated by the point method. This evaluation consists of comparing the working conditions and the requirements of skill, experience, etc., on the jobs in question; with a large number of key jobs which have already been evaluated and to which point weightings have been assigned. The average of actual rates paid these jobs on both a day-work and incentive basis are then plotted against the total point values determined by this evaluation.

In plotting these points, as shown in Fig. 1, there will generally be considerable dispersion. Some will be so obviously disproportionate that they must be ignored. The curves, however, which pass through the preponderance of the points can be assumed to represent the day-work and incentive wage scales in that specific company. It is not necessary that the jobs evaluated be common to both companies; it is not necessary that there be any similarity whatsoever. What is actually being done is drawing the company's wage scale in the same manner that they would, were they using a point system for job rating. Since, however, both companies' wage curves are drawn against a common base of point values, a direct comparison is immediately possible.

Wage Curves of Three Companies Compared

In Fig. 2 are three companies' wage curves, and one curve which is a district average drawn against difficulty points. These are actual wage curves of companies in an eastern industrial area drawn during a recent wage survey. In each case the lower of the two curves for any company is the curve of their day-work wages, and the upper curve that of incentive wages.

It is obvious at a glance that both the day-work and incentive wages paid by company "A" are considerably below the average for the district. It so happens that company "A" does not require as highly skilled labor as do companies "B" and "C," but that factor has been recognized; for the most difficult job in this company was rated at only 1000 points against 1120 in the other two companies. The slope of their incentive wage curve is also interesting, for it shows an average make-out above day rates of approximately 30 per cent for the lower laboring classes, whereas this make-out becomes only 10 per cent on the more highly skilled occupations. In short, it discloses a not entirely equitable price setting. The fact that the incentive curve is drawn over only part of their total range of difficulty points shows that the lowest and highest skilled jobs are performed entirely on a day-work basis.

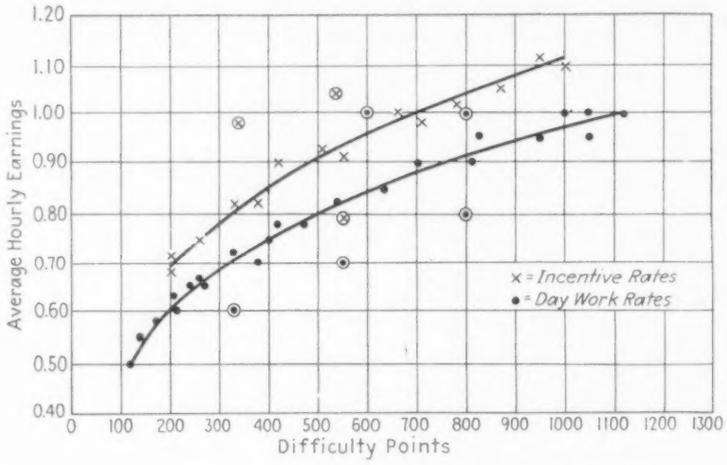


Fig. 1—Plotting the Wage Curve.

Comparisons Continued

The curves for company "B" indicate that its semi-skilled jobs are paid out of proportion to the rest of its wage scale. While these jobs are being paid above the district average, company "B's" laboring rates and rates for the highest skilled jobs are still below the market. This cannot be considered a healthy condition, and the remedy could lie in giving the major part of any future increases to the jobs at either end of the wage scale.

The wage curve for company "C" discloses a condition rather common today; that of the pressure brought by labor for increasing the minimum wage, both through arbitrary increases in the minimum, and through general increases of flat amounts rather than percentages. While their laboring rates are considerably above the district average, this advantage becomes progressively less as the skill requirements become greater.

This is all very well. Some one may say, these are interesting pictures of wage scales, but how accurate are they? All I can say is that they are as accurate as the evaluation made of the jobs upon which they were based. But this evaluation is more accurate than the overall comparisons which would otherwise have to be made. Moreover, it makes possible the measurement of many jobs which would otherwise have to be ignored due to the lack of similar jobs for comparison.

Procedure for Jobs Not Graphically Compared

As mentioned previously, these curves are drawn on the basis of an evaluation of jobs which the company feels to be in proper relative alinement. This then may exclude consideration of a certain limited number of jobs. Where this is the case, the jobs excluded will fall into one of two categories. Either they will be those whose rates are recognized as being dis-

proportionate but which are perpetuated because of certain local conditions or personalities, or they are specific jobs for which there is temporarily a large market demand. In either case it is proper that these jobs be disregarded; for our interest is in the average level of wages paid for jobs of varying degrees of difficulty, and so our evaluation and comparison must be restricted to jobs which will reflect this and not temporary or extraneous conditions. Should there be an interest in the market rates for any specific job or trade, a wage comparison can be made with companies employing that type of labor, but it should not be considered as representative of their general wage scales.

A Job for Trade Associations

A logical question from anyone interested in making wage comparisons on this basis is, "Does it involve our adoption of a job evaluation plan?" While job evaluation can be valuable to practically any concern for the purpose of establishing and maintaining their internal wage structure in proper alinement, it is not essential that they employ it in order to make wage comparisons such as I have outlined, so long as there is some trade or other association which can and will do the job for them.

In fact it is really a job for such an association. Several associations collect and disseminate wage rate information. All that would be necessary is for any such agency to adopt job evaluation themselves and apply it to their problem of circulating wage rate information.

Once set-up, this would necessitate less attention on their part than at present. Of course, to initiate such a plan would require the evaluation of a number of representative jobs in each member company, and the drawing of their wage scales. All subsequent wage surveys, however, would require no more than obtaining from member companies the day-work and incentive rates they were at the moment paying for the jobs which had already been evaluated. The point ratings originally established for these jobs will not change so long as the jobs themselves do not change, so that the rates periodically secured, when plotted against the permanent point ratings, immediately indicate the contemporary nature of the wage scale.

In making wage comparisons on this basis, such associations would be doing more than merely distributing wage rate information; they would be giving member concerns a valuable picture of their real wage scale such as they possibly had not seen before, and which would include by interpretation such things as their spread between day-work and incentive wages, the slope of their wage scale, and the general form of their wage structure, all in comparison with other concerns and the average for the district.

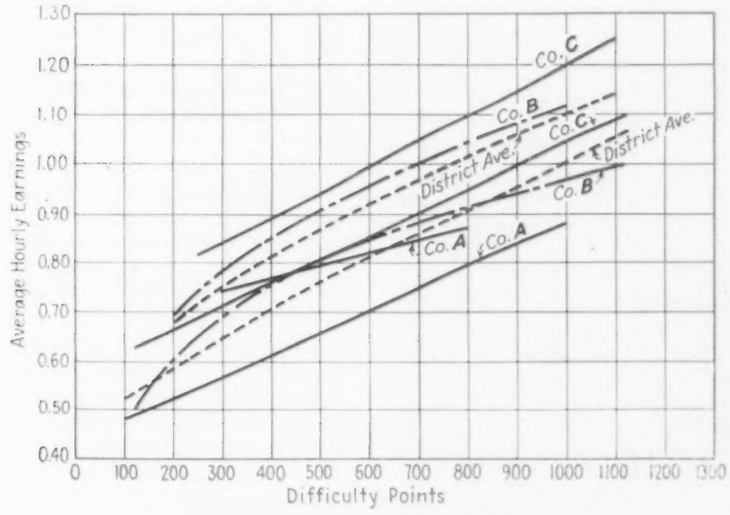


Fig. 2—Comparison of Wage Scales.

Any individual concern at present employing a job evaluation plan based upon the point method, can with little difficulty make profitable wage comparisons by this method.

Green Favors 40 Hr. Week, 40c. Minimum

WILLIAM GREEN, president of the AFL, recently projected his own ideas of what a wage-hour bill should be like shortly after ending his conference with CIO Generalissimo John L. Lewis —a meeting which was completely sterile of results.

The AFL version of minimum wage and maximum hour legislation called for administration by the Department of Justice and proposed a minimum wage of 40c. an hour and maximum hours of 40 a week. No Southern differential would be allowed.

The federation's "distressing experiences" with the NLRB prompted the AFL council to oppose establishment of an administrative board as proposed in the Administration's Black - Connery draft, which has finally been taken from the hostile House Rules Committee.

Green characterized the bill as of great advantage because of its "straightforward simplicity," and asserted "the South has got the wrong idea" about having lower wage scales.

Those who at first discounted the possibilities of passage due to the lack of Southern differentials recall that the Administration's bill was forced out of committee by bargaining Congressmen who were willing to trade votes for the assurance that their agriculture production control measure will be boosted for early passage.

Further complicating the wage-hour picture was the move by Chairman Mary T. Norton to revise the Administration's bill to provide for administration by the Labor Department, a change which Secretary of Labor Perkins has advanced as highly desirable.

Elimination of a so-called Labor Standards Board, as called for in the AFL draft, is expected to meet with the approval of most industrial groups although in a few highly seasonal industries the flexibility of giving a board some discretionary power was held highly desirable if a wage-hour bill was to be placed on the statute books.

Lubrication of Pinions and Roll Neck

LUBRICATION of gears, pinions, pinion bearings, and roll neck bearings is an important factor in a steel mill. Large savings in maintenance cost are possible with properly lubricated gearing; important reductions in power costs are also made possible by the use of low friction bearings, such as oil lubricated roll neck bearings, roller bearings, and bakelite composition bearings.

Those in charge of the operation of steel mills are concerned primarily with uninterrupted production and with close tolerances on dimensions of the rolled product. Successful operation of the new high-speed continuous mills without continuous automatic lubrication is hardly possible. This requirement is met more readily by the use of one lubricant for both gears and bearings. This means that mineral oils must be used on the teeth of large gears. By those who believe that only a heavy asphalt pitch will lubricate heavy gearing, the use of mineral oil is looked upon with considerable skepticism.

In an attempt to clear up this situation in the minds of those interested in the choice of a lubricant for large gears and pinions with particular reference to the viscosity of the lubricant, data are presented showing satisfactory lubrication obtained with both asphalt pitch and mineral oil. Asphalt pitch is always used as a bath into which the gears dip, and lubricates the upper gear by virtue of its ability to adhere to the metal. Mineral oil, however, should be sprayed or flowed into the mesh of the gears to obtain the best results. This statement is made regardless of the fact that the 46-in. bloomer pinions mentioned later have run for 10 years in a bath of light engine oil with remarkably light wear on the teeth.

In addition to this information on the lubrication of pinions and reduction gears, operating and test data are included, showing power savings incident to the use of bakelite composition bearings on a number of mills. Today's production requirements often force the operator to run heavy overloads on existing mill equipment. By replacing the babbitt or bronze bearings with bakelite bearings at moderate cost, it is possible to take these peak loads without overloading motors, gears, pinions, and shafting. The fact that these bearings, running on water only, save 30 to 40 per cent in power, and even more in some locations, makes them a very important factor in steel mill operations.

Actual operating data on the lubrication of large steel mill gears, pinions, and bearings, in many cases covering a period of several years, are presented in Tables 1-5. Table 1 is a compilation of pinion data for blooming mills, a structural mill, a rail mill and several bar or billet mills in one plant. Table 3 is similar to Table 1, but covers another plant and includes data on blooming mills, skelp, plate, rod and rail mills.

Table 2 gives the length of service and the tonnage for the pinions and pinion bearings recorded in Table 1. Wear of teeth is indicated by the use of general terms, although in some cases the estimated amount of wear is given. Table 4 gives the corresponding data for Table 3. In this table the term "worn" means anything up to ⅛ in. of the width of the tooth. Table 5 contains additional data from other plants showing the advantages of forged over cast steel pinions. The 35-in. rail mill reduction gear is a remarkable example of efficient lubrication using a light oil of 500 sec. viscosity in a circulating system.

The pressure per inch of width is based on the average maximum pressure to which the teeth are subjected, and is readily obtained from the switch board readings. Corrections were made for motor efficiency, and an additional deduction was made where reduction gears came between motor and pinions; 92-95 per cent efficiency was assumed for motors and 90-92 per cent for reduction gears.

The pressure on the pinion teeth of the 160-in. plate mill was not taken from the switch board readings alone. As the influence of two heavy flywheels far outweighs the motor input, it was necessary to plot the power and speed curves and add the flywheel horsepower driving the pinions at the point of maximum deceleration.

Pinion Life Analyzed

In order to analyze the data in Tables 1-5 it is necessary to make a

By JOHN F. PELLY
Lubrication Engineer
Bethlehem Steel Co.

Bearings in Modern Steel Plants

close study of the factors which affect the life of large steel mill gears. Is the type of steel more important than the properties of the lubricant? How important is the method of application of the lubricant? Is the lubrication of the pinion bearings a major factor? To what extent must one consider the general rolling conditions, including uniformity of heating of ingots or billets?

An instance of the minor importance of pinion lubrication on pinion life is shown in Table 6, referring to a 40-in. bloomer, with cast steel, cut-spur teeth, operating with a pressure of 2762 lb. per in. width, at 524 ft. per min.

The maximum tonnage obtained on any pinion listed therein was 712,855; the minimum was 40,013 and the average was about 230,000 tons. The cause for scrapping was usually broken teeth or broken necks. In the cases of broken teeth, the wear preceding the break was moderate and had absolutely no influence on the fact that breakage occurred. An asphalt bath was used for the pinions and No. 2 graphite grease for bearings. As the cast pinions failed mostly by breakage, lubrication was a secondary consideration in their life.

A set of forged steel pinions was then placed in service in this mill and rolled 701,627 tons before being scrapped due to motorizing the mill. The teeth were still in good condition. As they were subject to the same lubrication conditions as the cast pinions, it is evident that the rather rapid wear of the bearings was not an important factor in the pinion life.

After motorizing this mill, forged steel, helical-cut pinions were used in a new set of housings, with universal couplings between pinions and rolls. A circulating system was installed in bearings and pinions with oil of 1950 sec. viscosity at 100 deg. F. After three years, with an output of 1,134,504 tons, the teeth are in excellent condition, the bearings have never been changed and there is no reason why both bearings and pinions should not last many years.

There is truly a remarkable difference between these results and those given in the preceding for cast steel pinions with wabbler

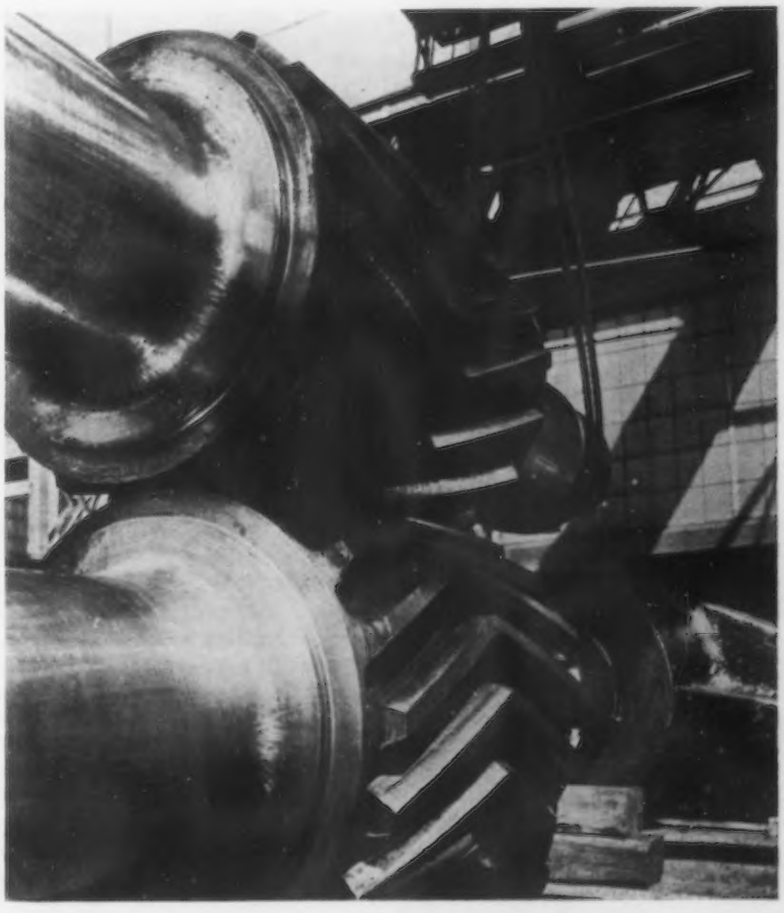


TABLE I—PINION DATA, PLANT A

Stand	Material	Teeth: No.	Teeth: Finish	Dimensions, In.: Eff. Face	Dimensions, In.: P. D.	Dimensions, In.: D. P.	Angle: Inv.	Angle: Hel.	Tooth Press. Lb./In. Face	Speed Ft. per Min.	Av. Max. Hp. per Roll	Speed Ratio Motor: Pinion	Motor: Rated Hp.	Motor: Rated R.p.m.	Motor: Av. Max. Load In Hp.	Motor: Type
54" Bloomer	2H	20	Cut	54	60	.372	25	20	6740	564	6900	1:1	7000	40/80	15000	D.C.
48" Roughing	2H	18	Cut	48	60	.371	20	16	6200	815	9200	1:1	7000	65/100	20000	D.C.
40" Supplement	2H	17	Cut	40	40	.425	20	20	1675	678	1380	1:1	1500	65/225	3000	D.C.
48" Finishing	2H	18	Cut	48	60	.371	20	16	4960	815	7350	1:1	7000	65/100	16000	D.C.
44" Bloomer	2H	18	Cut	44	59	.409	20	17	6280	575	6450	1:1	7000	50/120	14000	D.C.
35" Rougher	2H	24	Cut	36	44	.667	20	23	7270	470	4600	1:1	5000	50/120	10000	D.C.
32" Rail mill	2H	15	Cut	33	40	.455	20	20	4070	1290	6450	1:1	7000	150/175	14000	D.C.
40" Bloomer	2H	18	Cut	40	42	.450	20	20	7010	522	4630	1:1	7000	50/120	10000	D.C.
30" Bar mill	2H	28	Cut	28	29	1	20	23	7760	108	750	8.5:1	2500	125	3000	A.C.
Stand 2,	2H	28	Cut	28	29	1	20	23	4400	134	525	6.8:1				
Stand 3,	2H	28	Cut	28	29	1	20	23	5700	161	820	8.5:1	3000	187.5	3600	A.C.
Stand 4,	2H	28	Cut	28	29	1	20	23	3940	202	710	6.8:1				
Stand 5,	2H	28	Cut	28	29	1	20	23	4300	259	1000	8.5:1	3500	300	4100	A.C.
Stand 6,	2H	28	Cut	28	29	1	20	23	2630	322	750	6.8:1				
21" Bar mill	2H	21	Cut	21	29	1	20	23	6450	111	640	7.4:1	1500	150/300	1500	D.C.
Stand 2,	2H	21	Cut	21	29	1	20	23	7500	139	935	5.9:1	1500	150/300	2200	D.C.
Stand 3,	2H	21	Cut	21	29	1	20	23	6100	186	1020	5.9:1	2500	200/400	2400	D.C.
Stand 4,	2H	21	Cut	21	29	1	20	23	4460	234	935	4.7:1	2500	200/400	2200	D.C.
Stand 5,	2H	21	Cut	21	29	1	20	23	2880	330	850	3.3:1	2500	200/400	2000	D.C.
Stand 6,	2H	21	Cut	21	29	1	20	23	2020	425	765	2.6:1	2500	200/400	1800	D.C.
35" Break down	2H	24	Cut	36	44	.667	20	23	5100	470	3220	1:1	3500	50/120	7000	D.C.
28" Finishing	3H	18	Cut	29	40	.621	20	20	7330	570	5060	1:1	5000	75/150	11000	D.C.
24" Rougher	3H	14	Cut	24	25	.583	25	20	2190	755	1250	1:1	1500	87	2838	Steam
24" Finishing	3H	14	Cut	24	25	.583	25	20	2190	755	1250	1:1	1500	87	2838	Steam
16" Strand	3H	15	Cut	16	22	.938	22	18	2480	460	750	1:1	700	50/110	1775	Steam
18" Bar mill	2H	25	Cut	18	20	1.39	20	28	4200	71	180	10:1				
Stand 2,	2H	25	Cut	18	20	1.39	20	28	3920	118	280	6.1:1				
Stand 3,	2H	25	Cut	18	20	1.39	20	28	3200	165	320	4.3:1				
Stand 4,	2H	25	Cut	18	20	1.39	20	28	2620	236	375	3:1		150/300	6000	D.C.
Stand 5,	2H	25	Cut	18	20	1.39	20	28	2320	295	415	2.4:1	4500			
14" Bar mill, 6	2H	25	Cut	14	15	1.79	20	27	3100	330	465	1.7:1				
Stand 7,	2H	25	Cut	14	15	1.79	20	27	2575	402	470	1.4:1				
Stand 8,	2H	25	Cut	14	15	1.79	20	27	1920	440	380	1.3:1		150/300	2000	D.C.
Stand 9,	2H	25	Cut	14	15	1.79	20	27	1180	495	265	1.1:1				
Stand 10,	2H	25	Cut	14	15	1.79	20	27	640	550	160	1:1		150/300	6000	D.C.
16" Rougher	3H	15	Cast	16	22	.94	22	18	2620	502	860	1:1	1850	120/60	3500	A.C.
12" Finishing	3H	15	Cut	12	16	1.25	22	20	1170	1110	640	.34:1				
12" Roughing	2H	15	Cut	12	13	1.25	20	23	836	89	30	3.4:1				
Stand 2,	2H	15	Cut	12	13	1.25	20	23	3100	140	175	2.1:1				
Stand 3,	2H	15	Cut	12	13	1.25	20	23	1673	208	140	1.4:1	1700	90/95	1700	Steam
Stand 4,	2H	15	Cut	12	13	1.25	20	23	1125	298	135	1:1				
Stand 5,	2H	15	Cut	12	13	1.25	20	23	755	396	120	.75:1				
Stand 6,	2H	15	Cut	12	13	1.25	20	23	376	530	80	.56:1				
10"Finishing, 7,8	3H	29	Cut	10	15	3	20	31	533	702	170	.38:1				
Stand 9, 10	3H	29	Cut	10	15	3	20	31	265	999	120	.27:1	1900	100/105	1900	Steam
Stand 11, 12,	3H	29	Cut	10	15	3	20	31	168	1310	100	20:1				
12 Roughing	2H	15	Cast	12	13	1.25	20	23	4050	148	240	6.4:1				
Stand 2,	2H	15	Cast	12	13	1.25	20	23	1900	210	160	4.5:1				
Stand 3,	2H	15	Cast	12	13	1.25	20	23	966	282	110	3.4:1	1200	150/300	2200	A.C.
Stand 4,	2H	15	Cast	12	13	1.25	20	23	999	377	150	2.5:1				
10" Roughing, 5	2H	35	Cut	11	12	3.34	20	34	480	575	100	1.4:1				
Stand 6,	2H	35	Cut	11	12	3.34	20	34	580	714	150	1.2:1				
10" Finishing, 7,8	3H	33	Cut	10	12	3.41	20	32	652	1015	241	1:1	700	200/400	1050	A.C.
8" Finishing, 9,10	3H	35	Cut	8	9	4.38	20	29	638	1255	219	1:1	600	400/600	950	A.C.
Stand 11,	2H	35	Cut	8	9	4.38	20	29	793	1155	250	.73:1	700	200/400	943	A.C.
Stand 12,	2H	35	Cut	8	9	4.38	20	29	358	1540	150	.55:1				

Legend: All teeth double helical. Pinion material: C, steel casting, F, steel forging. Pinion material, mostly 0.50-0.60 carbon.

connections. Although the method of lubrication was of the most approved modern type on these forged steel pinions, it must be considered that the previous set of forged steel pinions subject to less perfect conditions of lubrication rolled 701,627 tons with little wear on the teeth. Quality of steel is therefore an important factor in pinion life.

In line with, but slightly different from this data, are the figures for a 48-in. bloomer pinion of cast steel, with 20-deg. straight teeth. Asphalt bath lubrication was used, and grease on bearings. Wabbler couplings were used. The data are given in Table 7.

Of the other pinions in this bloomer, 13 were scrapped due to broken teeth, necks, or wabblers,

TABLE 2—PINION LIFE AND TONNAGES, PLANT A

Mill	Type of Tooth	Life Years	Pinion Tonnage	Bearing Tonnage	Reason for Change of Pinion	Condition of Tooth	Press. Lb./In. Face	Speed Ft. per Min.	Visc. 210° F.	Lubrication
54" Bloomer	C-cut	5	902,000	902,000	Broken coupling end	Worn 3/8"	6740	564	220	A
48" Roughing	F-cut	6	1080,393	1080,393	Broken neck		6200	815	500	B
48" Finishing	F-cut	10 1/4	1319,945	1319,945	Never changed	Excellent	4960	815	500	B
40" Supplement	F-cut	10 1/4	1319,945	1319,945	Never changed	Excellent	1675	678	500	B
44" Bloomer	C-cut	9	2917,533	2917,533	Never changed	Excellent	6280	575	220	A
36" Rougher	C-cut	9	2109,549	2109,549	Never changed	Excellent	7270	470	200	A
32" 1st installation	C-cut	11	3965,000	3965,000	Collar off bearings	Worn 1/32"	4070	1290	200	A
32" 2nd installation	C-cut	4 1/2	794,231	794,231	Collar off bearings	Worn 1/16"	7000	1290	200	A
40" Bloomer	F-cut	13 1/2	4568,082	4568,082	Broken wabbler	Worn 1/8"	7010	522	220	A
30" Bar mill	F-cut	6	913,314	913,314	No change	Excellent	7760	161	500	B
21" Bar mill	F-cut	6	618,696	618,696	No change	Worn 1/8"	6500	200	500	B
35" Bloomer	C-cut	11	1556,131	1556,131	No change	Worn 1/16"	2530	470	220	A
28" Structural	C-cut	3 1/4	259,335	259,335	Worn wabblers	Worn 1/16"	1620	570	220	A
24" Bar mill	F-cut	12	960,000	80,000	Worn wabblers	Slight wear	2200	755	145	A
16" Bar mill	C-cut	16	800,000	420,000	Worn wabblers	Slight wear	2670	460	145	A
18" Bar mill	F-cut		420,000	420,000	Worn wabblers	Slight wear	3000	230	145	A
14" Bar mill	F-cut			78,000	Worn wabblers	Slight wear	2900	460	145	A
16" Bar mill	C-cast	8	568,616	235,000	Worn wabblers	Slight wear	1330	502	145	A
12" Bar mill	F-cut	7	397,465	85,000	Worn wabblers	Slight wear	585	1110	130	A
12" Bar mill, St. 1-6	C-cast	12	568,000	278,000	Worn wabblers	Worn 1/8"	1300	300	130	A
10" Bar mill, St. 7-12	F-cut	6	420,000	48,000	Worn wabblers	Worn 1/16"	530	1000	130	A
12" Bar mill, St. 1-4	C-cast	12	520,000	520,000	Worn wabblers	Worn 1/16"	2000	240	130	A
10 1/2" Bar mill, St. 5-6	F-cut	6 1/2	320,802	48,000	Worn wabblers	Good	500	600	130	A
9 2/5" Bar mill, St. 7-8	F-cut	6 1/2	281,277	48,000	Worn wabblers	Good	190	1015	130	A
8" Bar mill, St. 9-12	F-cut	6 1/2	232,304	48,000	Worn wabblers	Good	550	1300	130	A

All blooming mills reversing All pinions herringbone. Type of tooth: C = cast, F = forged.
Lubrication: A = Bath—asphalt pitch and cylinder oil.
B = Bath—4% Graphite grease and cylinder oil on necks.

with an average of 250,000 tons. An average of 600,000 tons was obtained from 14 still in service, with a maximum of 945,942 on one pinion in service off and on for 11 years.

The data on this 48-in. bloomer show that no trouble whatever, as far as pinion life was concerned, developed from lack of lubrication of bearings or teeth. The teeth showed a fair amount of wear, but not serious considering the long service. The wabblers were very troublesome and the chief source of pinion changes. Efforts to lubricate wabblers have always ended in failure. Improved universal joints or couplings have been introduced in later years and are now found not only between motor and pinions but between pinions and rolls. Lubricants are applied to these through commercial fittings and comparatively long life is attained. Those between pinions and rolls last 15 to 18 months, and in one case three years. A comparison of this data reveals that the savings in maintenance costs may be very large.

Cast vs. Forged Steel Pinions

In discussing lubrication of pinions and gears, it is proper to show that other factors such as quality of steel play an important part in increasing the life. In addition to the data presented on the 40-in. bloomer this is illustrated by data on the pinions of a 34-in. billet mill not listed in the tables. Asphalt bath on pinions and grease on neck were used in each case. For cast steel, cast teeth an average of 70,000 tons was obtained; for cast steel, cut teeth, 470,000 tons; and for forged steel, cut teeth, 900,000 tons (still in service).

Cut teeth are a great advantage and absolutely necessary for oil lubrication. Asphalt pitch and other heavy compound lubricants are satisfactory for cast teeth, as shown for the 16 and 12-in. bar mills in Table 2, but pinions with cut teeth have longer life.

The advantage of forged steel is also shown for the 35-in. bloomer in Table 5, although not so clearly, due to breaking of teeth. Life of cast steel pinions was 812,400 tons, with the teeth badly worn. Forged pinions gave 1,063,430 tons, but the teeth were only slightly worn at the pitch line. Engine oil of 250 sec. viscosity at 100 deg. F. on a circulating system was used. However the pinions were lubricated only by the bath, not by direct application to the teeth, which is more desirable.

The 20-in. merchant mill, Table 5, shows again, rather indefinitely, the advantage of forged steel—not in tonnage but in wear. After rolling over 200,000 tons, the forged pinion teeth showed only slight wear compared with the badly worn cast steel teeth. An asphalt pitch bath of 200 sec. viscosity at 210 deg. F. was used, with cup grease on the bearings.

A 134-in. plate mill using cast steel pinions averaged 100,000 tons, with a maximum of 267,000 tons on one pinion, which was still good. Forged steel pinions were finally used, and after 751,477 tons they were still in good condition. The cast steel pinions failed mostly from broken teeth. These results may have been favorably affected by better lubrication of the necks, as a motor pump was introduced several years ago to supply a high grade pressure grease to the necks. Formerly, with graphite cup grease, a great deal of bearing trouble had been experienced.

Heavy vs. Light Lubricants

The data given in Tables 2 and 4 are summarized in Table8. (All pinions are cast steel with cut teeth,

TABLE 3—PINION DATA, PLANT B

Stand		Material	PINION: No. of Teeth	Dimensions In. P. D.	Eff. Face	D. P.	Angle of Helix	Tooth Press. Lb./In. Face	Speed Ft. per Min.	Av. Max. Hp. per Roll	Speed Ratio Motor: Pinion	MOTOR: Rated Hp.	Rated R.p.m.	Av. Max. Load in Hp.	Type
46" Bloomer	2H	C	18	46	55	.381	17	6720	604	6450	1:1	7000	50/100	14000	D.C.
40" Bloomer	2H	C	18	40	48	.450	17	9000	525	6900	1:1	6250	50/100	15000	D.C.
21" Skelp mill	2H	F	27	27	32	1	23	8250	47	365	11.9:1				
Stand 2,	2H	F	27	27	32	1	23	8650	62	515	9.3:1				
Stand 3,	2H	F	24	24	32	1	23	7900	76	588	6.9:1	4000	83.3	4000	A.C.
Stand 5,	2H	F	24	24	32	1	23	3650	105	372	4.4:1				
Stand 6,	2H	F	21	21	32	1	23	3380	123	403	8.2:1				
Stand 7,	2H	F	21	21	32	1	23	5800	178	915	6.5:1				
Stand 9,	2H	F	21	21	32	1	23	3370	236	771	4.3:1	6500	187.5	6500	A.C.
Stand 10,	2H	F	21	21	32	1	23	2750	340	905	3:1				
Stand 12,	2H	F	21	21	32	1	23	2330	455	1020	6:1				
Stand 13,	2H	F	21	21	32	1	23	1840	605	1080	4.5:1	6700	500	6700	A.C.
Stand 14,	2H	F	21	21	32	1	23	1290	780	973	3.5:1				
24" Billet mill	2H	F	30	24	30	1.25	34	2163	126	246	3.9:1				
Stand 2,	2H	F	30	24	30	1.25	34	1918	149	260	3.4:1				
Stand 3,	2H	F	30	24	30	1.25	34	2330	176	372	2.9:1				
Stand 4,	2H	F	30	24	30	1.25	34	3317	234	710	2.2:1	4000	81	4000	D.C.
Stand 5,	2H	F	30	24	30	1.25	34	1337	281	337	1.8:1				
Stand 6,	2H	F	30	24	30	1.25	34	1677	352	540	1.4:1				
18"Billet mill	2H	F	25	18	20	1.38	28	6015	121	440	3.5:1				
Stand 2,	2H	F	25	18	20	1.38	28	2375	156	225	2.8:1				
Stand 3,	2H	F	25	18	20	1.38	28	2840	227	390	1.9:1	3250	92	4020	D.C.
Stand 4,	2H	F	25	18	20	1.38	28	1230	318	236	1.4:1				
Stand 5,	2H	F	25	18	20	1.38	28	1110	446	300	.98:1				
Stand 6,	2H	F	25	18	20	1.38	28	703	596	254	73:1				
12" Skelp mill	2H	F	21	13	15	1.61	21	521	1290	166	1:1				
Stand 2,	2H	F	21	13	15	1.61	21	740	1290	218	1:1				
Stand 3,	2H	F	20	12	15	1.66	15	830	1195	225	1:1	1800	275/550	1800	D.C.
Stand 4,	2H	F	20	12	15	1.66	15	1110	1195	303	1:1				
Stand 5,	2H	F	20	12	15	1.66	15	1690	1130	435	1:1				
Stand 6,	2H	F	20	12	15	1.66	15	1820	1130	467	1:1	1800	275/550	1800	D.C.
Stand 7,	2H	F	20	12	15	1.66	15	3840	628	550	1:1	1100	214/320	1100	D.C.
Stand 8,	2H	F	20	12	15	1.66	15	3140	770	550	1:1	1100	246/382	1100	D.C.
26" Rail, rougher	2H	C	13	26	32	.50	30	3980	494	1900	6.7:1	3000	500	4150	A.C.
26" Finishing,	2H	C	13	26	32	.50	30	2983	641	1850	5.2:1	3000	500	4030	A.C.
60" Un. plate, Hor.	2H	C	15	40	54	.375	25	1850	1050	3650	1:1				
60" Un. Plate, Vert.	2H	C	29	41	21	.712	25	2820	909	3650	1.2:1	4400	50/100	8000	D.C.
110" Plate, T&B	3H	C	22	40	48	.55	15	4640	556	830	1:1				
110" Plate, M	3H	C	14	26	48	.55	15	4640	556	830	1:1	4000	83.3	2700	D.C.
160" Plate mill, M,	3H	C	8	29	64	.278	..	5700	452	1676	1:1				
160" Plate mill, T&B	3H	C	13	47	64	.278	..	5700	452	1676	1:1	4500	370	5030	D.C.
12" Rod, rougher	2H	F	25	12	15	2.08	34	710	54	17	4.4:1				
Stand 1,	2H	F	25	12	15	2.08	34	6030	79	217	3:1				
Stand 2,	2H	F	25	12	15	2.08	34	4000	121	220	1.9:1				
Stand 3,	2H	F	25	12	15	2.08	34	2670	174	209	1.3:1				
Stand 4,	2H	F	25	12	15	2.08	34	1600	244	173	.95:1				
Stand 5,	2H	F	25	12	15	2.08	34	1470	330	220	.71:1				
Stand 6,	2H	F	25	12	15	2.08	34	800	468	166	.50:1				
10" Rod mill, 7	2H	F	25	10	13	2.75	29	720	650	173	1.6:1				
Stand 8,	2H	F	25	10	13	2.75	29	480	845	161	1.2:1	4000	370	4700	A.C.
Stand 9,	2H	F	25	10	13	2.75	29	160	1090	75	.92:1				
Stand 10,	2H	F	25	10	13	2.75	29	240	1340	126	.75:1				
Stand 11,	2H	F	25	11	13	2.75	32	152	1660	100	1:1				
Stand 12,	2H	F	25	11	13	2.75	32	128	2040	97	.82:1				
Stand 13,	2H	F	25	11	13	2.75	32	63	2400	57	7:1				
Stand 14,	2H	F	25	11	13	2.75	33	80	2750	84	6.1:1				
Stand 15,	2H	F	25	11	13	2.75	25	35	3100	42	5.5:1				
Stand 16,	2H	F	25	11	13	2.75	27	13	3240	15	5.4:1				

Legend: Pinion material: C, steel casting; F, steel forging. All teeth double helical, cut (except on 160-in. plate mill, step teeth) Angle of involute 20 deg. on all pinions. Pinions mostly 0.50 to 0.60 carbon.

except the 40-in. 4,568,082 tons, which was forged steel. All have universal couplings.)

In all these bloomers, except the 40-in. which had an unusual series of tooth breakage, the pinions are undoubtedly going to have a very long life.

The most interesting feature is that the 46-in. bloomer pinions have been lubricated successfully with ordinary engine oil, 300 sec. viscosity at 100 deg. F. The pinions were started on asphalt pitch bath and the bearings on an engine oil system. In a short time the contamination caused bearing trouble, and the system was changed over to

TABLE 4—PINION LIFE AND TONNAGES, PLANT B

Mill	Type of Tooth	Life Years	Pinion Tonnage	Life of Bearings Years	Reason for Change of Pinion	Condition of Tooth	Press. Lb./In. Face	Speed Ft. per Min.	Visc. Sec.	Deg. F.	Lubrication
46" Bloomer	C	10	5047,076	10	Broken coupling	Worn	3360	1207	300	100	E
40" Bloomer	C	2	1178,712	2	Broken teeth	Worn	4190	1049	500	210	A
27" Skelp St. 1, 2	F	10	3212,275	10	None changed	Worn	8650	62	1700	100	F
24" Skelp St. 3-5	F	10	3212,275	10	None changed	Worn	7900	76	1700	100	F
21" Skelp St. 6-14	F	8	2655,000	8	4 changed bearings	Worn	5800	178	1000	100	F
24" Billet mill	F	18	3244,616	12	2 sets broken	Worn	3317	234	300	100	B
18" Billet mill	F	14	3675,700	10	1 set broken	Worn	6015	121	300	100	B
12" Skelp, St. 1, 2	F	9	488,493	9	None changed	Worn			500	100	F
12" Skelp, St. 3-8	F	9	488,493	9	None changed	Worn			500	100	F
26" Rail, Rough	C	6	720,450	4	2 sets broken	Worn	3980	494	700	100	F
26" Rail, Finish	C	3	480,000	2	3 sets bearings	Worn	2983	641	700	100	F
60" Plate Hor.	C	8	749,596	4	Worn bearings	Worn	1850	1050	500	210	A
60" Plate Vert.	C	8	749,596	4	No record		2820	909	500	210	A
110" Plate T&B	C	4½	316,577	1	1 worn out, 1 broken	Worn	4155	556	200	210	A
110" Plate Middle	C	2½	228,985	1	2 worn out, 1 broken	Worn	4650	556	200	210	A
160" Plate	C	7	188,865	1	None changed	Worn			5000	210	S
12" Rod mill	F	9	897,052	9	None scrapped	Slight wear	6030	79	550	100	F
10" Rod mill	F	9	768,900	9	None scrapped	Slight wear	720	650	550	100	F

All pinions cut herringbone, except 160 in. plate mill with cast step teeth. Type of tooth: C—Cast, F—Forged. All teeth cut.
Lubrication: A = Bath—asphalt; B = Bath, red engine oil; E = Circ. red engine oil; F = Circ. filtered oil; S = swabbed asphalt.

one lubricant for bearings and pinions. The wear was carefully noted for years and after rolling 5,047,076 tons is now about ⅛ in., which is believed to be a normal amount for well lubricated pinions of this type after 10 years. This is an apparent refutation of previous data showing that forged steel gives better life than cast steel; when a mill is designed and operated in such a way that breakage rarely occurs, cast steel pinions will give long life.

It will be noted that a good record was obtained on the 40-in. bloomer with a bath of asphalt pitch of 220 sec. viscosity at 210 deg. F., a force feed pump supplying cylinder oil to the bearings. The excess oil dropped into the bath and ran out an overflow to be reclaimed. After 13½ years and 4,568,082 tons, the wear of the teeth was ⅛ in. The appearance of the teeth was glass smooth, with a small depression on the pitch line, and a feather edge on working outer face.

Referring to Table 2, it is seen that all pinions listed are lubricated by a bath of heavy asphalt pitch varying in viscosity with the size of the pinion, the smaller pinions having a lighter lubricant. In a general way the pinions having the greater tooth pressure are supplied with the heavier lubricant, regardless of velocity. Table 4, on the other hand, lists a number of mills lubricated by mineral oils, most of which are of comparatively low viscosity. Although only the bloomers of Tables 2 and 4 are directly comparable, it can be seen in a general way that satisfactory results are obtained by both methods of lubrication.

An interesting comparison can be made between the results obtained for the 18-in.-14-in. mill on Table 2 lubricated by an asphalt pitch bath and a similar mill (not in table) at another plant, with circulating oil system, 500 sec. viscosity at 100 deg. F. Forged steel, cut pinions, with 0.50 to 0.60 carbon were used in both cases. Except in one case no pinions were discarded in 11 years in either mill. The pinions in the last stand of the 14-in. mill, lubricated with oil, showed heavy tooth wear and were discarded after only 36,709 tons. The steel was too soft in this case, only 0.22 C.

Bar or billet mills with 500 sec. viscosity oil on a circulating system to pinions and bearings show about the same results as those lubricated with an asphalt pitch bath. Worn wabblers are the main trouble, rarely worn teeth or bearings. These mills had circulating oil systems to table rolls and roll drive.

TABLE 5—PINION DATA, PLANT C

Mill	Type of Tooth	Life Years	Tonnage Pinions	Reason for Change	Condition of Tooth	Press. Lb./In. Face	Speed Ft. per Min.	Lubricants	
								Pinion or Gear	Bearings
35" Bloomer	35" F		1063,430	Broken teeth	Slight wear	7620	274.8	Oil system,	Oil system,
35" Bloomer	35" C		812,400	Broken teeth	Bad wear	7620	274.8	250 sec., 100° F.	250 sec.,100° F.
35" Rail Mill	28" F Red. Gear	11	2297,982	Still in	¼" wear	1108	2290	Oil system, 500 sec., 100° F.	Oil system, 500 sec., 100° F.
20" Merchant	F	6-7/12	212,557	Still in	Slight wear	2750	422	Asphalt bath	Cup Fed
20" Merchant	C	2¼	220,770		Bad wear	2750	422	200 sec., 100° F.	Grease

All pinions herringbone. F = forged, C = cast. All teeth cut.

TABLE 3—PINION DATA, PLANT B

Stand		Material	PINION: No. of Teeth	Dimensions In.: P. D.	Eff. Face	D. P.	Angle of Helix	Tooth Press. Lb./In. Face	Speed Ft. per Min.	Av. Max. Hp. per Roll	Speed Ratio Motor: Pinion	MOTOR: Rated Hp.	Rated R.p.m.	Av. Max. Load in Hp.	Type
46" Bloomer	2H	C	18	46	55	.381	17	6720	604	6450	1:1	7000	50/100	14000	D.C.
40" Bloomer	2H	C	18	40	48	.450	17	9000	525	6900	1:1	6250	50/100	15000	D.C.
21" Skelp mill	2H	F	27	27	32	1	23	8250	47	365	11.9:1				
Stand 2,	2H	F	27	27	32	1	23	8650	62	515	9.3:1	4000	83.3	4000	A.C.
Stand 3,	2H	F	24	24	32	1	23	7900	76	588	6.9:1				
Stand 5,	2H	F	24	24	32	1	23	3650	105	372	4.4:1				
Stand 6,	2H	F	21	21	32	1	23	3380	123	403	8.2:1				
Stand 7,	2H	F	21	21	32	1	23	5800	178	915	6.5:1	6500	187.5	6500	A.C.
Stand 9,	2H	F	21	21	32	1	23	3370	236	771	4.3:1				
Stand 10,	2H	F	21	21	32	1	23	2750	340	905	3:1				
Stand 12,	2H	F	21	21	32	1	23	2330	455	1020	6:1				
Stand 13,	2H	F	21	21	32	1	23	1840	605	1080	4.5:1	6700	500	6700	A.C.
Stand 14,	2H	F	21	21	32	1	23	1290	780	973	3.5:1				
24" Billet mill	2H	F	30	24	30	1.25	34	2163	126	246	3.9:1				
Stand 2,	2H	F	30	24	30	1.25	34	1918	149	260	3.4:1				
Stand 3,	2H	F	30	24	30	1.25	34	2330	176	372	2.9:1	4000	81	4000	D.C.
Stand 4,	2H	F	30	24	30	1.25	34	3317	234	710	2.2:1				
Stand 5,	2H	F	30	24	30	1.25	34	1337	281	337	1.8:1				
Stand 6,	2H	F	30	24	30	1.25	34	1677	352	540	1.4:1				
18"Billet mill	2H	F	25	18	20	1.38	28	6015	121	440	3.5:1				
Stand 2,	2H	F	25	18	20	1.38	28	2375	156	225	2.8:1				
Stand 3,	2H	F	25	18	20	1.38	28	2840	227	390	1.9:1	3250	92	4020	D.C.
Stand 4,	2H	F	25	18	20	1.38	28	1230	318	236	1.4:1				
Stand 5,	2H	F	25	18	20	1.38	28	1110	446	300	.98:1				
Stand 6,	2H	F	25	18	20	1.38	28	703	596	254	73:1				
12" Skelp mill	2H	F	21	13	15	1.61	21	521	1290	166	1:1				
Stand 2,	2H	F	21	13	15	1.61	21	740	1290	218	1:1	1800	275/550	1800	D.C.
Stand 3,	2H	F	20	12	15	1.66	15	830	1195	225	1:1				
Stand 4,	2H	F	20	12	15	1.66	15	1110	1195	303	1:1				
Stand 5,	2H	F	20	12	15	1.66	15	1690	1130	435	1:1	1800	275/550	1800	D.C.
Stand 6,	2H	F	20	12	15	1.66	15	1820	1130	467	1:1				
Stand 7,	2H	F	20	12	15	1.66	15	3840	628	550	1:1	1100	214/320	1100	D.C.
Stand 8,	2H	F	20	12	15	1.66	15	3140	770	550	1:1	1100	246/382	1100	D.C.
26" Rail, rougher	2H	C	13	26	32	.50	30	3980	494	1900	6.7:1	3000	500	4150	A.C.
26" Finishing,	2H	C	13	26	32	.50	30	2983	641	1850	5.2:1	3000	500	4030	A.C.
60" Un. plate, Hor.	2H	C	15	40	54	.375	25	1850	1050	3650	1:1	4400	50/100	8000	D.C.
60" Un. Plate, Vert.	2H	C	29	41	21	.712	25	2820	909	3650	1.2:1				
110" Plate, T&B	3H	C	22	40	48	.55	15	4640	556	830	1:1	4000	83.3	2700	D.C.
110" Plate, M	3H	C	14	26	48	.55	15	4640	556	830	1:1				
160" Plate mill, M,	3H	C	8	29	64	.278	..	5700	452	1676	1:1	4500	370	5030	D.C.
160" Plate mill, T&B	3H	C	13	47	64	.278	..	5700	452	1676	1:1				
12" Rod, rougher	2H	F	25	12	15	2.08	34	710	54	17	4.4:1				
Stand 1,	2H	F	25	12	15	2.08	34	6030	79	217	3:1				
Stand 2,	2H	F	25	12	15	2.08	34	4000	121	220	1.9:1				
Stand 3,	2H	F	25	12	15	2.08	34	2670	174	209	1.3:1				
Stand 4,	2H	F	25	12	15	2.08	34	1600	244	173	.95:1				
Stand 5,	2H	F	25	12	15	2.08	34	1470	330	220	.71:1				
Stand 6,	2H	F	25	12	15	2.08	34	800	468	166	.50:1				
10" Rod mill, 7	2H	F	25	10	13	2.75	29	720	650	173	1.6:1				
Stand 8,	2H	F	25	10	13	2.75	29	480	845	161	1.2:1	4000	370	4700	A.C.
Stand 9,	2H	F	25	10	13	2.75	29	160	1090	75	.92:1				
Stand 10,	2H	F	25	10	13	2.75	29	240	1340	126	.75:1				
Stand 11,	2H	F	25	11	13	2.75	32	152	1660	100	1:1				
Stand 12,	2H	F	25	11	13	2.75	32	128	2040	97	.82:1				
Stand 13,	2H	F	25	11	13	2.75	32	63	2400	57	7:1				
Stand 14,	2H	F	25	11	13	2.75	33	80	2750	84	6.1:1				
Stand 15,	2H	F	25	11	13	2.75	25	35	3100	42	5.5:1				
Stand 16,	2H	F	25	11	13	2.75	27	13	3240	15	5.4:1				

Legend: Pinion material: C, steel casting; F, steel forging. All teeth double helical, cut (except on 160-in. plate mill, step teeth) Angle of involute 20 deg. on all pinions. Pinions mostly 0.50 to 0.60 carbon.

except the 40-in. 4,568,082 tons, which was forged steel. All have universal couplings.)

In all these bloomers, except the 40-in. which had an unusual series of tooth breakage, the pinions are undoubtedly going to have a very long life.

The most interesting feature is that the 46-in. bloomer pinions have been lubricated successfully with ordinary engine oil, 300 sec. viscosity at 100 deg. F. The pinions were started on asphalt pitch bath and the bearings on an engine oil system. In a short time the contamination caused bearing trouble, and the system was changed over to

TABLE 4—PINION LIFE AND TONNAGES, PLANT B

Mill	Type of Tooth	Life Years	Pinion Tonnage	Life of Bearings Years	Reason for Change of Pinion	Condition of Tooth	Press. Lb./In. Face	Speed Ft. per Min.	Visc. Sec.	Deg. F.	Lubrication
46" Bloomer	C	10	5047,076	10	Broken coupling	Worn	3360	1207	300	100	E
40" Bloomer	C	2	1178,712	2	Broken teeth	Worn	4190	1049	500	210	A
27" Skelp St. 1, 2	F	10	3212,275	10	None changed	Worn	8650	62	1700	100	F
24" Skelp St. 3-5	F	10	3212,275	10	None changed	Worn	7900	76	1700	100	F
21" Skelp St. 6-14	F	8	2655,000	8	4 changed bearings	Worn	5800	178	1000	100	F
24" Billet mill	F	18	3244,616	12	2 sets broken	Worn	3317	234	300	100	B
18" Billet mill	F	14	3675,700	10	1 set broken	Worn	6015	121	300	100	B
12" Skelp, St. 1, 2	F	9	488,493	9	None changed	Worn			500	100	F
12" Skelp, St. 3-8	F	9	488,493	9	None changed	Worn			500	100	F
26" Rail, Rough	C	6	720,450	4	2 sets broken	Worn	3980	494	700	100	F
26" Rail, Finish	C	3	480,000	2	3 sets bearings	Worn	2983	641	700	100	F
60" Plate Hor.	C	8	749,596	4	Worn bearings	Worn	1850	1050	500	210	A
60" Plate Vert.	C	8	749,596	4	No record		2820	909	500	210	A
110" Plate T&B	C	4½	316,577	1	1 worn out, 1 broken	Worn	4155	556	200	210	A
110" Plate Middle	C	2½	228,985	1	2 worn out, 1 broken	Worn	4650	556	200	210	A
160" Plate	C	7	188,865	1	None changed	Worn			5000	210	S
12" Rod mill	F	9	897,052	9	None scrapped	Slight wear	6030	79	550	100	F
10" Rod mill	F	9	768,900	9	None scrapped	Slight wear	720	650	550	100	F

All pinions cut herringbone, except 160 in. plate mill with cast step teeth. Type of tooth: C—Cast, F—Forged. All teeth cut. Lubrication: A = Bath—asphalt; B = Bath, red engine oil; E = Circ. red engine oil; F = Circ. filtered oil; S = swabbed asphalt.

one lubricant for bearings and pinions. The wear was carefully noted for years and after rolling 5,047,076 tons is now about ⅛ in., which is believed to be a normal amount for well lubricated pinions of this type after 10 years. This is an apparent refutation of previous data showing that forged steel gives better life than cast steel; when a mill is designed and operated in such a way that breakage rarely occurs, cast steel pinions will give long life.

It will be noted that a good record was obtained on the 40-in. bloomer with a bath of asphalt pitch of 220 sec. viscosity at 210 deg. F., a force feed pump supplying cylinder oil to the bearings. The excess oil dropped into the bath and ran out an overflow to be reclaimed. After 13½ years and 4,568,082 tons, the wear of the teeth was ⅛ in. The appearance of the teeth was glass smooth, with a small depression on the pitch line, and a feather edge on working outer face.

Referring to Table 2, it is seen that all pinions listed are lubricated by a bath of heavy asphalt pitch varying in viscosity with the size of the pinion, the smaller pinions having a lighter lubricant. In a general way the pinions having the greater tooth pressure are supplied with the heavier lubricant, regardless of velocity. Table 4, on the other hand, lists a number of mills lubricated by mineral oils, most of which are of comparatively low viscosity. Although only the bloomers of Tables 2 and 4 are directly comparable, it can be seen in a general way that satisfactory results are obtained by both methods of lubrication.

An interesting comparison can be made between the results obtained for the 18-in.-14-in. mill on Table 2 lubricated by an asphalt pitch bath and a similar mill (not in table) at another plant, with circulating oil system, 500 sec. viscosity at 100 deg. F. Forged steel, cut pinions, with 0.50 to 0.60 carbon were used in both cases. Except in one case no pinions were discarded in 11 years in either mill. The pinions in the last stand of the 14-in. mill, lubricated with oil, showed heavy tooth wear and were discarded after only 36,709 tons. The steel was too soft in this case, only 0.22 C.

Bar or billet mills with 500 sec. viscosity oil on a circulating system to pinions and bearings show about the same results as those lubricated with an asphalt pitch bath. Worn wabblers are the main trouble, rarely worn teeth or bearings. These mills had circulating oil systems to table rolls and roll drive.

TABLE 5—PINION DATA, PLANT C

Mill	Type of Tooth	Life Years	Tonnage Pinions	Reason for Change	Condition of Tooth	Press. Lb./In. Face	Speed Ft. per Min.	Lubricants	
								Pinion or Gear	Bearings
35" Bloomer	35" F		1063,430	Broken teeth	Slight wear	7620	274.8	Oil system,	Oil system,
35" Bloomer	35" C		812,400	Broken teeth	Bad wear	7620	274.8	250 sec., 100° F.	250 sec.,100° F.
35" Rail Mill	28" F	11	2297,982	Still in	¼" wear	1108	2290	Oil system,	Oil system,
	Red. Gear							500 sec., 100° F.	500 sec., 100° F.
20" Merchant	F	6-7/12	212,557	Still in	Slight wear	2750	422	Asphalt bath	Cup Fed
20" Merchant	C	2¼	220,770		Bad wear	2750	422	200 sec., 100° F.	Grease

All pinions herringbone. F = forged, C = cast. All teeth cut.

TABLE 6—HISTORY OF CUT, CAST STEEL PINIONS ON A 40-IN. BLOOMER

Pinion	In Service	Out of Service	Tons	Reason for Change
1	10-3-25	4-24-26	332,759	Worn bearings
	2-26-27	8-28-27	210,233	" "
	2-24-28	6-16-28	169,363	" "
			712,855	
2	10-3-25	4-24-26	332,759	
3	9-17-26	11-20-26	78,771	Running rough
	11-17-28	1-2-29	77,035	Broken wabbler on another pinion
	4-13-29	5-8-29	45,381	Broke another pinion
	11-9-29	12-10-29	17,030	" " "
			218,217	
4	2-27-27	8-28-27	210,233	Worn bearings
	2-24-28	6-16-28	169,863	" "
	12-10-29	1-3-30	45,751	Broken neck on another pinion
			425,847	
5 & 6	6-16-28	11-17-28	147,176	Scrapped, soft metal
7 & 8	5-5-29	10-5-29	283,947	" broken teeth
9 & 10	10-5-29	11-9-29	40,013	" " "
11	3-4-30	4-12-30	60,119	" " "
12	9-17-26	11-20-26	78,771	Worn bearings
	1-3-30	2-18-30	69,300	" "
	2-18-30	3-4-30	15,840	" "
	4-12-30	4-19-30	11,434	" "
			175,345	Scrapped, broken teeth
13	11-17-28	1-2-29	77,035	Scrapped, broken wabbler
14	8-21-26	9-17-26	48,873	Broke another pinion
	1-27-27	2-26-27	40,047	Broke neck in another pinion
	8-28-27	2-24-28	172,438	Broke neck
			261,358	Scrapped, broken neck
15	8-21-26	9-17-26	48,873	No record
	4-13-29	5-5-29	45,381	Broken neck
			94,254	Scrapped, broken neck
16	4-24-26	8-21-26	169,137	Worn bearings
	11-20-26	1-27-27	63,187	Broke neck on another pinion
	8-28-27	2-24-28	172,438	" " " " "
	1-3-30	2-18-30	69,300	Worn bearings
	2-18-30	3-4-30	15,840	No record
	4-12-30	4-19-30	11,434	Broke
			501,336	Scrapped, broken
17	4-24-26	8-21-26	169,137	Worn bearings
	11-20-26	1-27-27	63,187	Broken neck on another pinion
	1-2-29	4-13-29	19,865	Worn bearings
	12-10-29	1-3-30	45,751	Broke neck
			297,940	Scrapped, broken neck
18	1-27-27	2-26-27	40,047	Broken neck on another pinion
	1-2-29	4-13-29	19,865	Worn bearings
	11-9-29	12-10-29	17,036	Broke neck
			76,948	Scrapped, broken neck

which is not economical on account of leakage. Tables should be lubricated by semi-automatic grease systems.

An outstanding example of oil lubrication is given in Table 5, for the 35-in. rail mill reduction gear pinion. Oil of 500 sec. at 100 deg. F. is circulated to gears and bearings. Pressure on pinion is 1108 lb. per sq. in., at 2290 ft. per min. After 11 years 2,297,982 tons have been rolled. The pinion shows a wear of about 1/64 in., and three of the four original bearings are in service. This set of gears will undoubtedly last many times 11 years, as far as tooth wear is concerned.

An interesting story is also recorded in the life of the 160-in. plate mill reduction gears. Pinion data is shown in Table 3, but gear data are not shown. At a recorded load of 5030 hp. the 29-in. diameter reduction gear pinion, taking 95 per cent motor efficiency, receives 4770 hp. at a speed of 351 r.p.m., corresponding to 2640 ft. per min. The tooth pressure is 60,000 lb., or, for a width of 33 in., 1820 lb. per in.

This is a high pressure for a speed of 2640 ft. per min., yet it is not the true pressure in this case because two flywheels pump energy into the mill as they decelerate at the particular instant corresponding to the data given. It has been computed that at this point the pressure per inch of width on the reduction gear pinion becomes 7000 lb., instead of 1820 as given. This is an extremely high pressure to be carried at 2640 ft. per min. In fact, from the lubrication standpoint it is the most severe condition that has come into our range of activities.

Regarding the lubrication of this reduction gear, it was originally decided to install a circulating oil system on reduction gears and bearings. A 400 sec. at 100 deg. F. oil was used, and immediately heavy pitting took place. It was observed that the load was taken only on 4 in. of the 33 in. width of the gear, making it doubtful if any conceivable lubricant would prevent further pitting. Change to a heavy asphalt pitch bath was of no avail, the pitting continued until it covered two-thirds of the width, showing that the lubricant was no factor at all. Later oil was put back on the gears and no further pitting took place. When the load is concentrated on teeth not properly formed, no type of lubricant seems capable of preventing the metal from crushing.

Resume

Tables 2 and 4 show two distinct methods of lubricating pinions and gears, one by an asphalt pitch bath with cylinder oil on bearings, the other by an oil circulating system. Both are correct, as one fundamental law of lubrication is to insure a continuous supply of lubricant at the points requiring protection. A force feed pump supplying cylinder oil to the bearings and a bath of heavy adhesive lubricant fulfill this law. The level of the

lubricant in the housing is kept at the pitch line of the lowest gear. If higher, there is a heavy drag, and the heat generated raises the temperature of the lubricant and reduces its viscosity. The higher level, when used with lighter lubricants, results in foaming which at times may rise through the breather opening at the top of the housing.

A circulating oil system spraying oil at the mesh line of the teeth also fulfills the law. A bath in addition is highly undesirable owing to the increased aeration and oxidation. If desired an alarm system may be connected with the line to warn of stoppage of oil.

Reviewing the data, it is impossible to lay down any rigid rule for choosing the proper viscosity oil for gears and pinions. Almost any viscosity appears satisfactory. For pressures of 4000 to 8000 lb. per in. at velocities of 40 to 100 ft. per min., an oil of 1700 sec. at 100 deg. F. is believed desirable. In all other cases either 800 or 500 sec. oils are needed and there is little reason to doubt that 500 sec. oil would take care of all remaining conditions. When an asphalt pitch bath is used, it is observed from Table 2 that viscosities of 500 sec. at 210 deg. F. down to 130 sec. at 210 deg. F. give satisfactory lubrication for the various types and sizes of mills.

The second requirement for good lubrication is clean oil. Oil must be filtered or centrifuged regularly. None of the oils in our gear oil systems have ever been discarded except in one case where grease from roller bearings drained into the oil, causing a thickening or livering of the whole batch.

Having one lubricant for pinions and pinion bearings, with one automatic system to handle both, undoubtedly offers great advantages. Troubles due to mixing of bearing and gear lubricants are prevented, and errors due to the human element are reduced.

Reviewing the facts influencing the life of steel mill pinions and gears, it is evident that the quality and the hardness of the steel is a very important factor which reduces breakage of teeth, necks, and wabblers. The data indicate that bearing life is a rather unimportant consideration in the life of large pinions, although it is undoubtedly a big factor in the life of smaller gears. Proper application of the lubricant to bearings and pinions is seen to result in long life for both, and is therefore of great importance. The viscosity of the lubricant is evidently a minor consideration, based on the data presented. There is no evidence, in these data, that heavy lubricants prevent breakage of pinion teeth by cushioning shock loads such as caused by non-uniform heating or over-draft in rolling.

TABLE 7—HISTORY OF CAST STEEL PINIONS ON A 48-IN. BLOOMER

In Service	Out of Service	Tons	Reason for Change
7-10-20	10-23-20	112,654	New ends on wabblers
11-4-21	3-24-22	140,308	" " " "
8-14-25	1-2-26	117,868	" " " "
4-29-28	6-2-28	43,070	" " " "
6-2-28	6-30-28	39,166	" " " "
No record	9-3-33	56,689	" " " "
" "	7-1-35	2,290	Broke at thermit weld. Welded
" "	4-14-37	167,727	One tooth broken
Total	.....	679,772	Good for further service

TABLE 8—SUMMARY OF BLOOMER DATA IN TABLES 2 AND 4

Bloomer	Tonnage	Reason for Change	Lubrication
54 in	902,000	Still in	Asphalt bath on pinions, cylinder oil on necks
44 "	2,917,533	" "	
40 "	4,568,082	" "	
35 "	1,556,131	" "	
40 "	1,178,712	2 sets worn out 4 sets broken	Asphalt bath on pinions, grease on necks
46 "	5,047,076	Still in	Circulating system of light engine oil on necks and pinions

Over 5,000,000 tons of steel ingots have been rolled in this 46-in. reversing blooming mill, without pinion failure. A circulating system of light engine oil is used on roll necks and pinions.

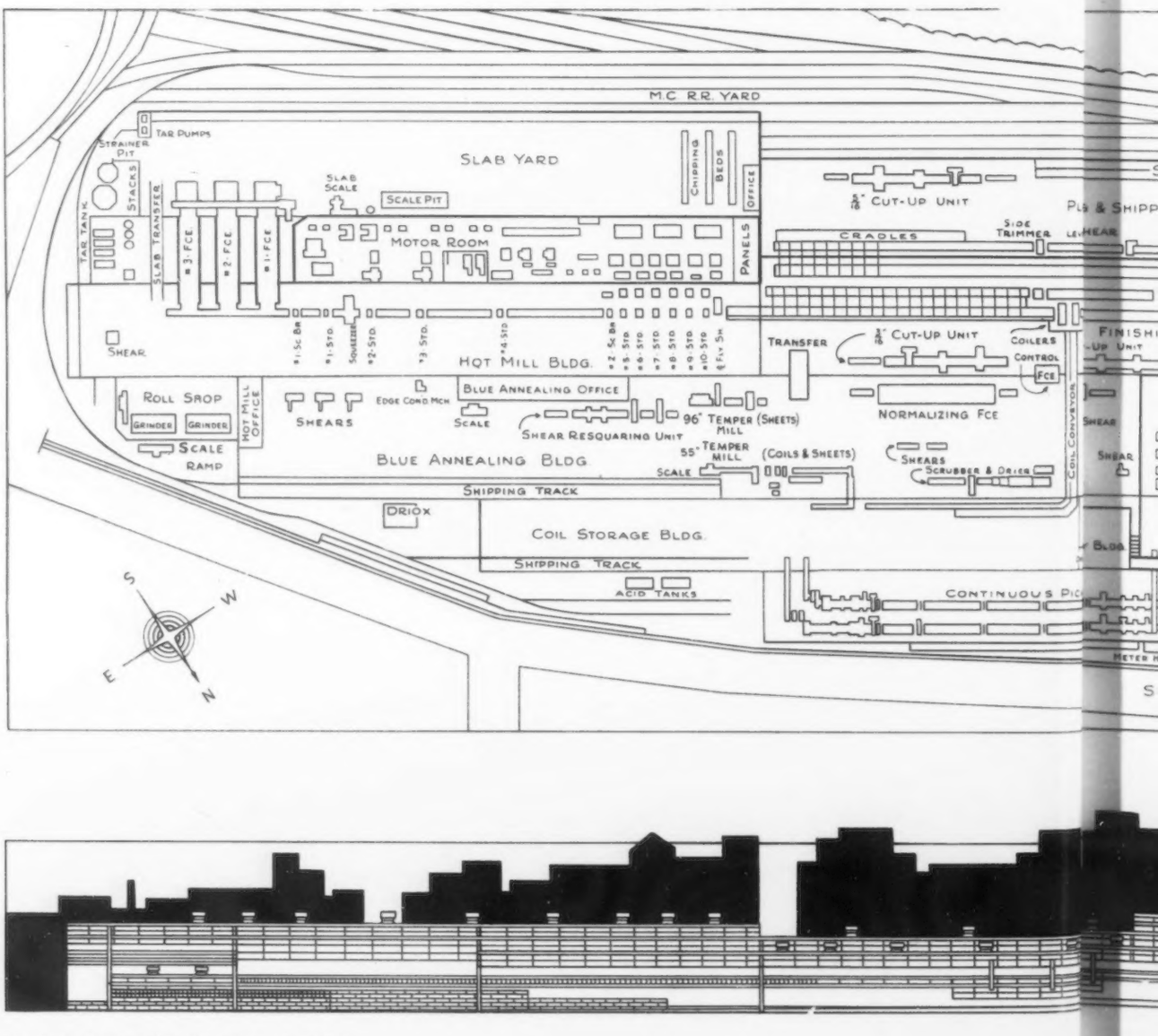
Jones & Laughlin's N

MARKING its entry into the wide strip and sheet market, the Jones & Laughlin Steel Corp., Pittsburgh, has now in production its $25,000,000 96-in. continuous hot strip, sheet and plate mill and cold reducing equipment for sheets, strip and tin plate. A consideration of the various products made by the company prompted the addition of the continuous mill in order to round out a general balanced production.

The mill is especially flexible in that it rolls strip in coil form, sheets in various lengths, and lighter gaged plates. A fair portion of the hot strip is for cold reduced tin plate. The company is also producing skelp on the new mill, and equipment has been installed for the manufacture of galvanized flat and corrugated sheets.

The mill is one of the largest now in production with an estimated annual capacity of 600,000 to 700,000 tons a year, although a steady run on certain sizes might easily produce a 75,000-ton month. The building of this equipment places for the first time a large continuous strip mill in the Pittsburgh district, although another steel company has in operation a semi-continuous plate mill and has under construction a continuous strip mill.

LAYOUT OF THE NEW JONES LAUG

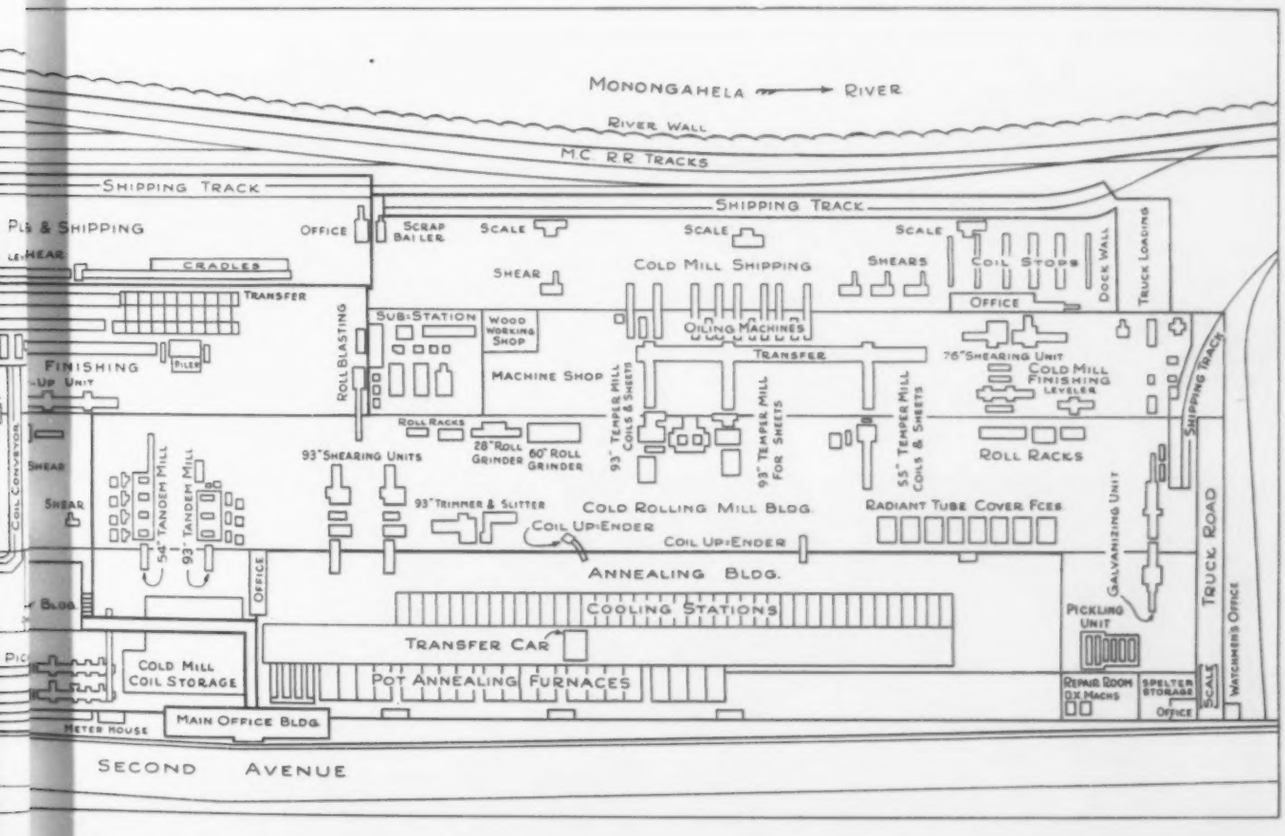


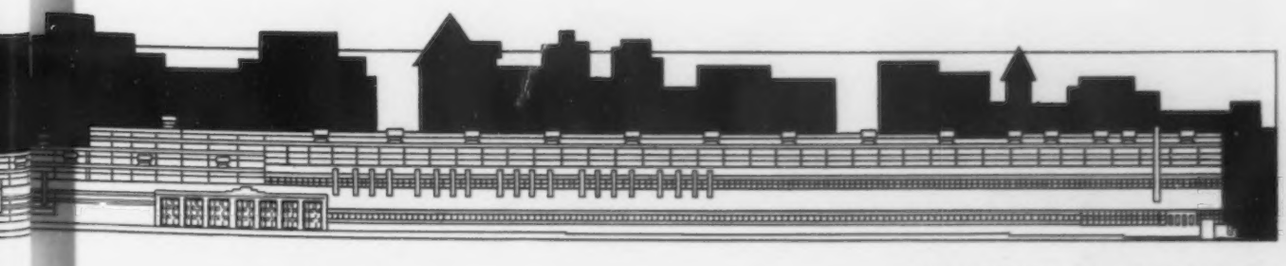
's New Strip Mill

The most difficult problem facing Jones & Laughlin engineers was the question of available space. It was decided that an area in excess of 25 acres along the Monongahela River and across from the company's South Side plant would be utilized. This choice necessitated considerable moving of material and equipment. Approximately 300,000 tons of iron ore were transported to other points, the unusual feature of this action being that 75 per cent of the ore was moved by truck. A main office building and three pig machines were dismantled, the latter being replaced by two larger and later type machines at another location. It was necessary to move the billet yard and dismantle three large cranes, as well as relocate a green sand foundry. Probably the most interesting feature of the "moving" was the relocation of the company's exceedingly large reinforcing bar bending plant. It was also necessary to move the company's tie plate machines.

The buildings which house the hot and cold finishing mills extend nearly a half mile. Considerable thought was given in laying out the equipment so as to reduce to a minimum all backtracking of materials from one finishing department to another.

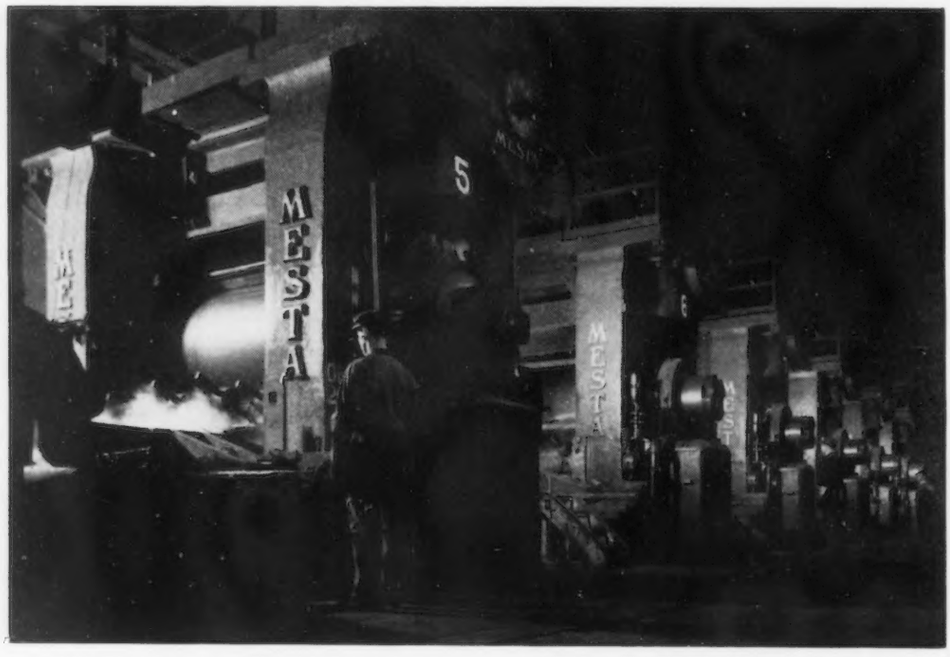
S LAUGHLIN STRIP MILL BUILDING





The principal hot mill equipment consists of 10 four-high stands (four roughing stands and a six stand finishing train) and two two-high scale breakers. As the slab leaves the continuous heating furnace it approaches the first scale breaker after which it reaches the first "turn-around." After leaving the spreading mill, another "turn-around" operates and the steel continues through three universal roughers. Upon leaving the last roughing stand the material proceeds to a table over which is a pyrometer arrangement. Depending on the grades or type of sheets, strip or plate being made, the passage of the steel is retarded until such time as the proper rolling temperature is reached before proceeding through the six finishing stands. Beyond the last finishing stand are the flying shears which, of course, operate when rolling sheets or strip cut to length. On strip that is to be coiled, the steel continues down the hot bed to one of two coilers where the operation is completed. The coils are then marked, gaged, inspected and tied and sent on their way underground by conveyor to the pickling or shipping department.

The hot beds of the mill are so arranged that when plates are being rolled they are transferred from the mill hot bed to the plate hot bed, where they are straightened and sheared. The layout of the mill is such that the handling, finishing and shipping of plates,



ABOVE

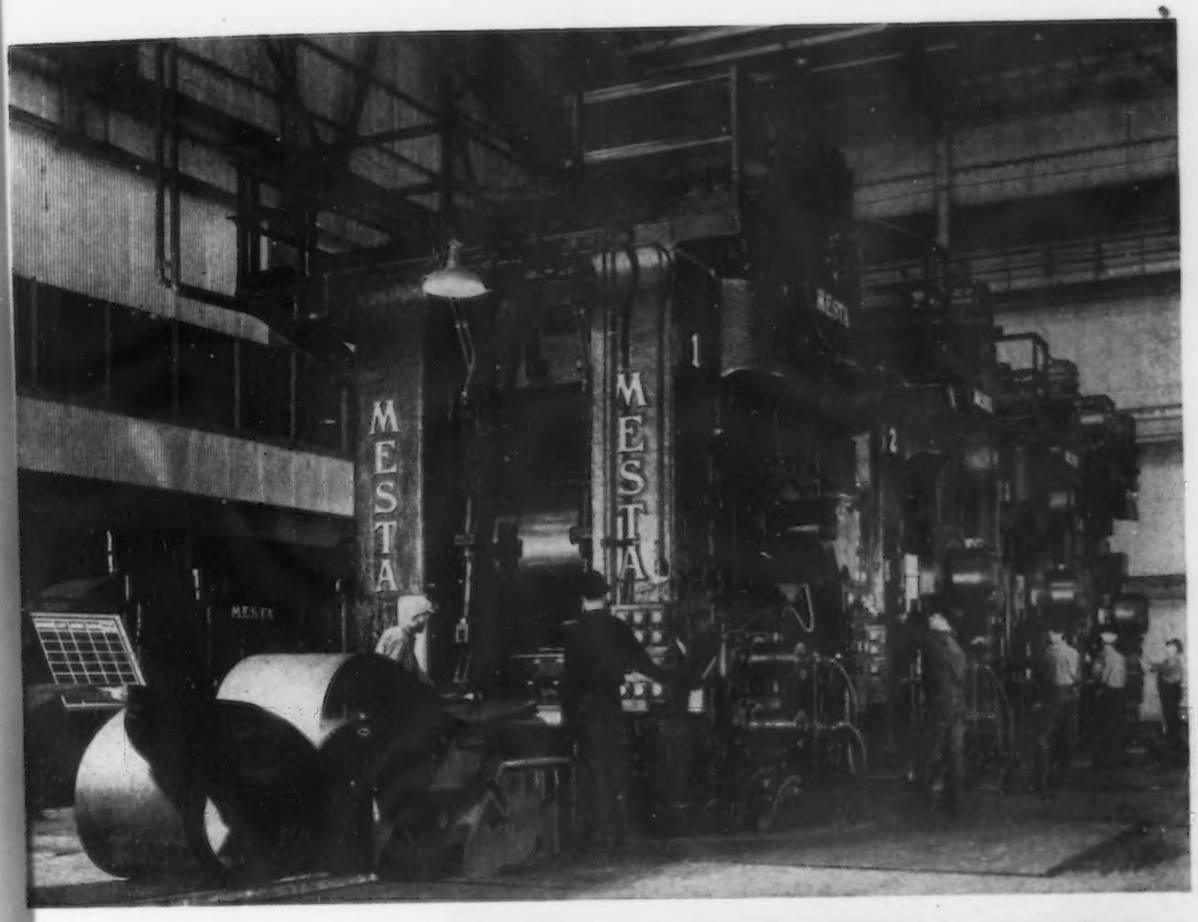
A NIGHT view of the $25,000,000 strip mill plant built by the Jones & Laughlin Steel Corp.

o o o

AT LEFT

FINISHING train on 96 in. continuous hot mill.

H. E. LEWIS, Chairman of the Board, Jones & Laughlin Steel Corp. Drawn by John Frew for The Iron Age.



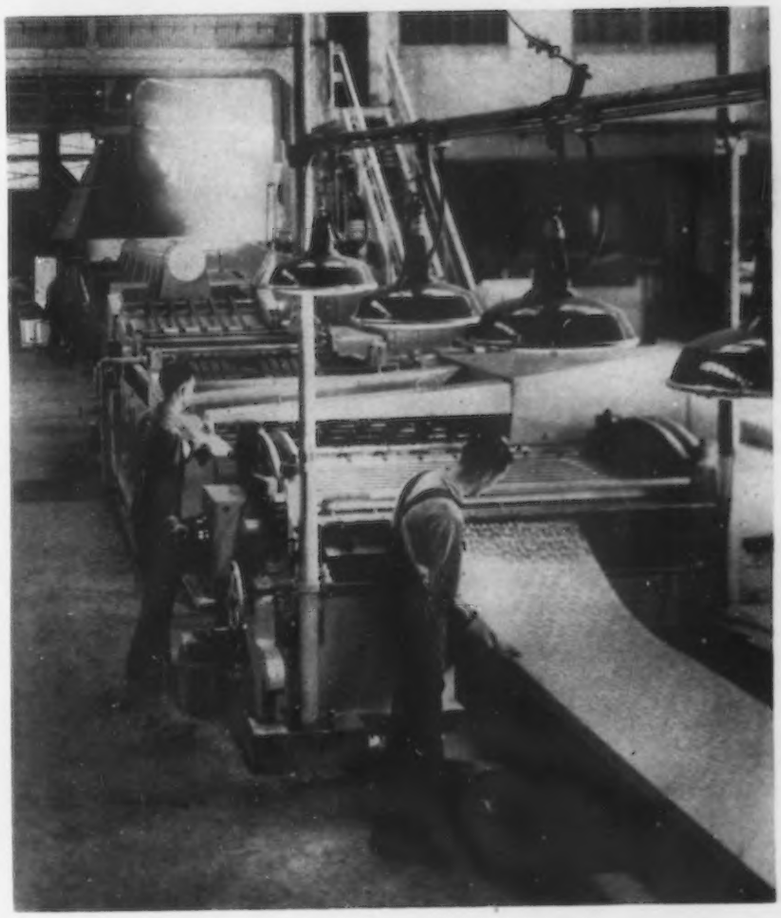
ABOVE

THE 54-in., four-stand, tandem cold mill.

AT RIGHT

DELIVERY end of the galvanizing equipment.

o o o

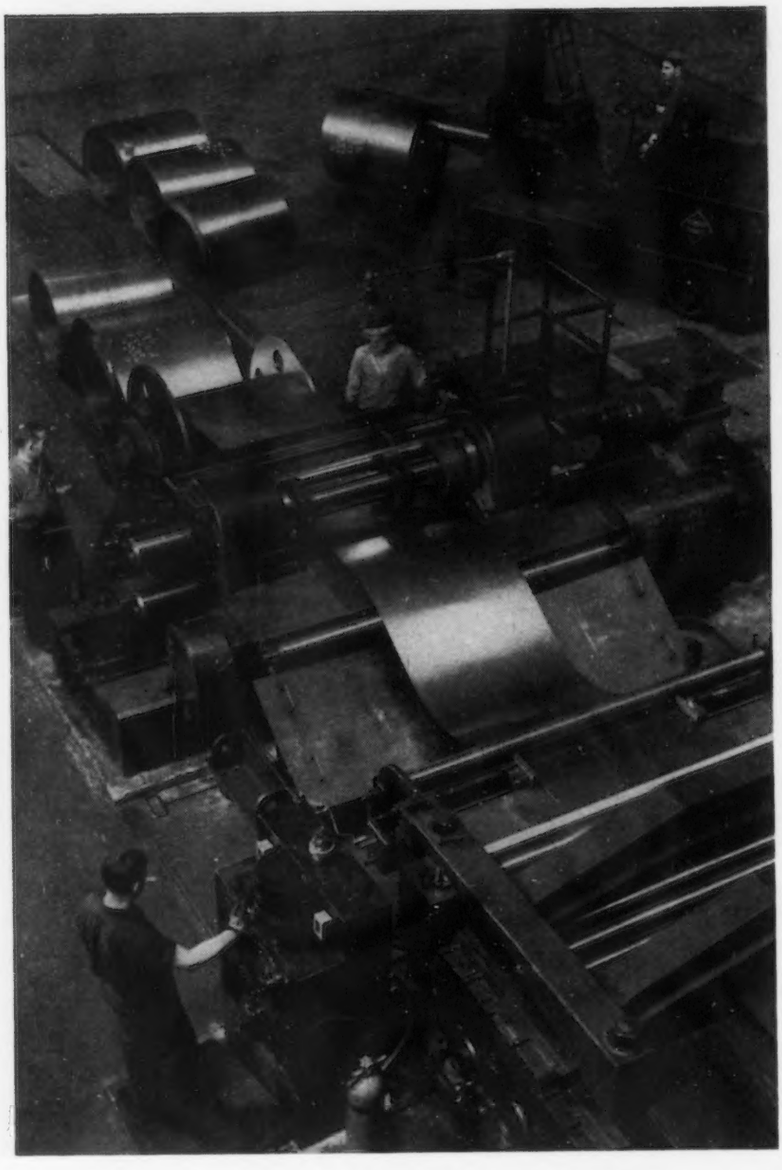


strip or sheets is restricted to the particular product involved, thus allowing for economy of operation and handling.

The hot and cold mills and auxiliary equipment were manufactured by Mesta Machine Co., Pittsburgh. Besides the major hot mill equipment is a 96-in. two-high skin pass mill for hot rolled sheets only. A 55-in. two-high skin pass mill has been provided for hot rolled sheets or coils.

The Cold Rolling Equipment

Principal cold rolling equipment includes a 54-in. four-stand tandem cold mill constructed so that it can reduce either sheet, strip or tin plate gages of strip. The work rolls on this mill are 20½ x 54 in. and the back-up rolls 53 x 51 in. When the mill is working on tin plate gages, the material, after be-



CUTTING up unit, showing roller levelers, slitter and side trimmer.

ing cold reduced, is sent to the company's Aliquippa works, where the final temper passing and tinning is completed. Should Jones & Laughlin's requirements for cold rolled sheets increase to an extent that the entire output of the 54-in. tandem mill is needed for this purpose, it is expected that the company will provide increased capacity for cold reducing tin plate gages at its Aliquippa plant.

A 93-in. three-stand tandem mill for cold rolling sheets has been provided, the work roll dimensions being 20½ x 93 in. while the backup rolls 53 x 90 in. A duplicate of equipment includes a 93-in. four-high temper pass mill for sheets and coils, the work rolls of which measure 20½ x 93 in. and the backup rolls 53 x 90 in. A duplicate of this particular mill has also been installed for temper passing sheets only. The company has provided for narrower widths of sheets or strip with a 55-in. two-high skin pass mill, the roll measurements of which are 28 x 55 in. Supplementing this cold mill equipment are levelers, trimmers and shears. The company has also installed two 54-in. Mesta roll grinders in the hot mill and a 54-in. and a 28-in. roll grinder in the cold mill.

Two lines of continuous picklers have been installed, ahead of which are strip processors. For coil annealing, the company has installed a substantial number of portable bell type, gas fired, radiant tube furnaces, while sheets will be annealed in the latest design, box type, annealing furnaces.

The motor room for the hot mill is air conditioned and, for extra precaution, is sealed against water to a point about 12 ft. above the floor. This action was taken to eliminate damage to motors by flood water. The principal motor equipment consists of General Electric motors ranging from 500 hp. to 4500 hp.

Electrical statistics on these motors are as follows:

Rolling Mill Stand	Hp.	R.P.M.
Scale breaker	1000	375
No. 1 rougher (spreader)	3000	150
No. 2 rougher.....	3000	375
No. 3 rougher.....	3000	500
No. 4 rougher.....	3000	500
Scale breaker	500	150/600
No. 1 finishing stand	4500	125/250
No. 2 finishing stand	4500	125/250
No. 3 finishing stand	4500	125/250
No. 4 finishing stand	4500	125/250
No. 5 finishing stand	4500	125/250
No. 6 finishing stand	3000	175/350

3 main drive M.G. Sets each 6000 kw.
2 auxiliary M.G. Sets each 1500 kw.

New Power Station Built

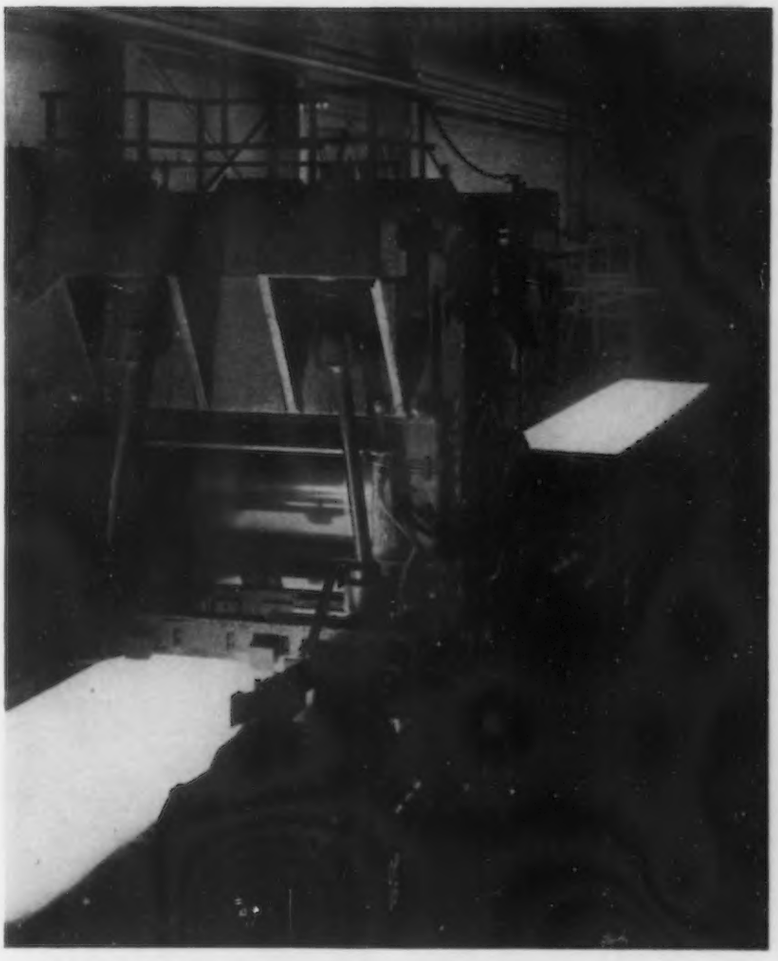
In constructing the new mill, it was necessary for Jones & Laughlin to build a new up-to-date power station. Briefly, this consists of three 25,000 kva. and one 12,500 kva. General Electric turbo-generators, all of which have a power factor averaging approximately 80 per cent. The current from the power house is 6600 volts, three phase, 25 cycle.

In addition to and indirectly connected with the construction of the new strip-sheet mill, Jones & Laughlin has in operation a new 135-ton stationary open-hearth furnace at its Aliquippa works. The operation of this furnace will relieve the steel making department at the company's Pittsburgh works plant, as it has been customary, when necessary, to ship steel from the latter location to the Aliquippa works.

To round out these improvements, Jones & Laughlin recently installed three five-pit batteries of one way fired soaking pits at its South Side works. Each of the pits is 16 ft. 6 in. long x 7 ft. 2 in. wide and 11 ft. 6 in. deep to the braize line which is large enough to accommodate six 90-in. ingots or six large slab ingots 80 x 52 x 26 in. The construction of these pits results in uniform heating of the

ingot from top to bottom, regardless of the location of the ingots in the pit. Coke oven gas is used for fuel and the burner is so designed that combustion is completed in a space approximately 3 ft. in height between the cover and the top of the tallest ingot before the burned gases hit the opposite wall.

An interesting feature during the construction of the mill refers especially to the personnel and training problem. About a year before the strip mill was started the company had under construction a new blooming mill. The building of this began at a time when there was no shortage of skilled workmen. The employees working on the construction of the blooming mill, whether skilled or unskilled, gained considerable valuable experience. When the building of the strip mill was started, the supply of skilled labor had decreased considerably and a common advantage both to the company and the employees was gained by transferring the men from the completed blooming mill project to the new strip mill job. Throughout the construction of the latter, a considerable number of employees gained experience to the extent that many of them were retained for the actual operation and maintenance of the new mill and auxiliary equipment.



SLAB entering last roughing stand of the new mill.

o o o

OFFICERS of the Kropp Forge Co., Chicago, a 100-year-old concern, which recently celebrated the anniversary by the dedication of a new machine shop. Left to right, they are: Raymond B. Kropp, vice-president; Charles J. Johnson, secretary and treasurer; Roy A. Kropp, president, and Arthur W. Hellstrom, vice-president and works manager.

o o o

U. S. Steel Moves Control of Sales, C

WILLIAM BEYE
Vice-President, Labor Relations

o o o

C. H. RHODES
Vice-President, Purchases

UNITED States Steel Corp. will transfer control of its sales, operating, labor and purchasing departments from New York to Pittsburgh on Jan. 1.

This change, expected to take more than 100 New York employees, including officials, to Pittsburgh, will be accomplished through a management company headed by Benjamin F. Fairless, president, and the following officials:

Thomas Moses, vice-president in charge of raw materials.

R. E. ZIMMERMAN
Vice-President, Research

Walter Mathesius, vice-president in charge of operations.

C. V. McKaig, vice-president in charge of sales.

William Beye, chief counsel and vice-president in charge of industrial relations.

Max D. Howell, vice-president, secretary and treasurer.

R. E. Zimmerman, vice-president for research.

C. H. Rhodes, vice-president in charge of purchases.

Harold L. Hughes, vice-president, with special duties.

Concentration of United States Steel's management activities (aside from financial matters) at Pittsburgh will climax a 10-year program of reorganization for that company and its subsidiaries.

Reasons for Move

Explaining the move to Pittsburgh, Myron C. Taylor, the corporation chairman, said:

"Within the past 10 years the United States Steel Corp. has conducted an exhaustive study of all its affairs with a view better to adjust its capital structure, location of its plants, their character, equipment, operations and personnel, to meet modern operating conditions. To this end it has already made and still is making large expenditures for improvements in those localities best suited to its operations and for the better service to its customers in its natural markets.

"From time to time it has announced the major policies which have been developed and made effective. The concluding plan of major revision in this 10-year cycle of activity is intended to accomplish a more closely coordin-

H. L. HUGHES
Vice-President, Special Duties

s, Operating Departments to Pittsburgh

ated relationship between the activities of its several subsidiary companies.

"The first features of the plan, consisting of various consolidations of subsidiaries within the corporation, have already been effected, an outstanding example being the merger of the activities of Carnegie Steel Co. and Illinois Steel Co. in 1935, followed in 1936 by the addition of American Sheet & Tin Plate Co. under the corporate title of Carnegie-Illinois Steel Corp.

"Many changes in personnel have taken place at various times, and others have recently been announced.

"To accomplish a closer operating relationship between the several subsidiary companies it has now been concluded to concentrate the supervision of a considerable number of the existing subsidiaries, excluding public service subsidiaries and railroads, within a management corporation to be known as the United States Steel Corp. of Delaware, the entire capital stock of which is owned by the parent company, the United States Steel Corp. of New Jersey. The companies thus involved contemplate a contractual relationship with the United States Steel Corp. of Delaware, under which they will arrange for its services in a supervisory capacity.

"The principal headquarters of the Delaware corporation will be at Pittsburgh, which is a central location more convenient to the management of the subsidiaries and more closely in touch with the atmosphere of a steel corporation. This arrangement will also bring the staff of the Delaware corporation into closer and more intimate relationship with the current activity of such subsidiary companies.

"The board of directors of the Delaware corporation will consist of 21 members. Benjamin F. Fairless will become president of the Delaware corporation and as heretofore announced, will on Jan. 1, 1938, become president of the United States Steel Corp. of New Jersey.

(CONTINUED ON PAGE 84)

WALTER MATHESIUS
Vice-President, Operations

MAX D. HOWELL
Vice-President, Treasurer

THOMAS MOSES
Vice-President, Raw Materials

C. V. McKaig
Vice-President, Sales

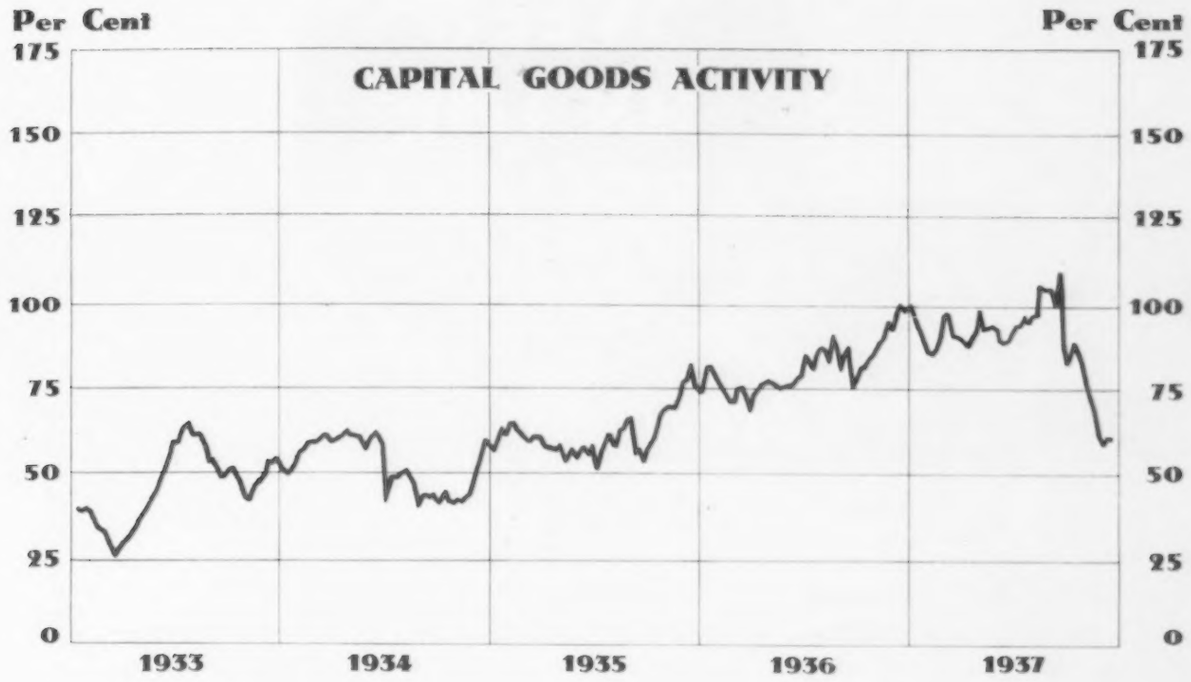
Current Metal Working Activity

Latest Data Assembled by THE IRON AGE from Recognized Sources.

	November, 1937	October, 1937	September, 1937	October, 1936	Ten Months, 1936	Ten Months, 1937
Steel Ingots: (gross tons)						
Monthly output[a]	2,153,781	3,392,691	4,301,869	4,534,246	38,060,388	45,891,460
Average weekly output[a]	502,047	765,844	1,005,110	1,023,532	873,546	1,056,676
Per cent of capacity[a]	38.22	58.31	76.52	78.15	66.69	80.67
Pig Iron: (gross tons)						
Monthly output[b]	2,006,724	2,892,629	3,410,371	2,991,887	24,556,395	33,114,269
Raw Materials:						
Coke output[c] (net tons)		4,262,946	4,679,875	4,299,900	37,395,300	45,999,617
Lake ore consumed[d] (gross tons)		4,203,873	5,157,411	4,384,908	35,818,890	49,344,994
Castings: (net tons)						
Malleable, production[e]		42,953	52,728	51,778	459,088	542,037
Malleable, orders[e]		34,810	41,662	55,521	451,147	362,260
Steel, production[e]		65,957	83,047	74,775	653,202	924,632
Steel, orders[e]		36,837	57,414	59,431	673,256	815,711
Finished Steel (net tons)						
Trackwork shipments[a]	4,289	6,137	8,101	5,547	58,478	84,028
Fabricated shape orders[f]		46,912	132,432	130,989	1,320,867	1,381,381
Fabricated shape shipments[f]		149,308	163,541	156,717	1,292,315	1,415,403
Fabricated plate orders[e]		31,942	31,484	33,791	392,554	373,914
U. S. Steel Corp. shipments[g]	587,241	792,310	1,047,962	1,007,417	8,875,124	11,749,156
Ohio River steel shipments[h]		89,750	122,600	145,065	930,446	1,097,395
Fabricated Products:						
Automobile production[i]		369,193	175,620	264,495	4,148,857	5,040,060
Construction contracts[j]		$202,081‡	$207,072‡	$225,768‡	$2,267,396‡	$2,509,095‡
Steel barrels shipped[e]		938,443	725,699	924,797	6,971,797	8,476,910
Steel furniture shipments[e]		$1,918‡	$2,084‡	$1,777‡	$15,487‡	$21,807‡
Steel boiler orders[e] (sq. ft.)		611,720	661,372	968,845	8,701,981	8,623,644
Locomotives ordered[k]	13	0	8	22	180	278
Freight cars ordered[k]	1,625	21	1,195	1,310	38,664	47,826
Machine tool index[l]	127.7	152.0	210.7	136.5	127.5†	180.8†
Foundry equipment index[m]		185.2	231.8	173.8	160.4†	224.6†
Non-Ferrous Metals: (net tons)						
Lead shipments[n]		39,292	53,850	59,210	411,016	508,060
Lead stocks[n]		100,646	90,742	183,430	.....	.....
Zinc shipments[o]	32,221	40,345	47,737	53,963	445,570	507,890
Zinc stocks[o]	42,984	25,817	13,517	68,744	.....	.....
Tin deliveries[p] (gross tons)	5,195	8,210	8,245	6,005	61,730	73,450
Refined copper deliveries[q]		44,592	66,229	75,919	614,772	751,393
Refined copper stocks[q]		181,842	144,321	178,018	.....	.....
Exports: (gross tons)						
Total iron and steel[r]		522,611	542,740	256,918	2,709,853	6,384,875
All rolled steel[r]		264,809	213,990	127,470	917,471	2,074,552
Finished steel[r]		217,787	173,902	105,922	822,006	1,714,938
Scrap[r]		184,547	252,713	119,568	1,704,723	3,466,055
Imports: (gross tons)						
Total iron and steel[r]		37,186	37,071	64,509	552,275	481,272
Pig iron[r]		11,870	7,911	7,264	144,871	95,908
All rolled steel[r]		15,964	13,796	29,730	229,970	254,504
British Production: (gross tons)						
Pig Iron[s]	762,300	769,600	726,600	670,300	6,367,100	6,929,100
Steel ingots[s]	1,178,300	1,133,600	1,163,000	1,060,500	9,678,500	10,681,900

†Three months' average. ‡000 omitted.

Source of data: [a] American Iron and Steel Institute; [b] THE IRON AGE; [c] Bureau of Mines; [d] Lake Superior Iron Ore Association; [e] Bureau of the Census; [f] American Institute of Steel Construction; [g] United States Steel Corp.; [h] United States Engineer, Pittsburgh; [i] Preliminary figures from Automobile Manufacturers Association—Final figures from Bureau of the Census, U. S. and Canada; [j] F. W. Dodge Corp.—37 Eastern states; [k] *Railway Age*; [l] National Machine Tool Builders Association; [m] Foundry Equipment Manufacturers Association; [n] American Bureau of Metal Statistics; [o] American Zinc Institute, Inc.; [p] New York Commodities Exchange; [q] Copper Institute; [r] Department of Commerce; [s] British Iron and Steel Federation.



THE IRON AGE Weekly Index of Capital Goods Activity

(1925-27 = 100)

Week ended Dec. 11	60.5	Same week 1934	50.8
Preceding week	60.9*	Same week 1933	49.0
Same week last month	61.6	Same week 1932	40.1
Same week 1936	97.5	Same week 1931	52.0
Same week 1935	77.2	Same week 1930	78.4
Same week 1929	99.2		

* Revised.

WITH the approach of the year end, THE IRON AGE index of capital goods activity shows a definite tendency to level off at 60 per cent of the 1925-27 base average. The loss for the week of Dec. 11 was 0.4 points from the revised index figure of the previous week, the smallest weekly loss since the decline started in mid-September. The leveling out process is further emphasized by the fact that the index has lost only 1.1 points from its level of a month ago. Losses for the week were recorded in the Pittsburgh and the steel ingot series which dropped 3.2 points and 2.4 points, respectively. Fractional gains were recorded in automobile assemblies and heavy construction awards due to the week's losses being less than the seasonal trend. The weighted index for the month of November, as computed from the weekly index numbers, was 64.9, as compared with 67.8 for October and 90.0 for November, 1936.

	Latest Week	Change from Preceding Week
Steel production (per cent of capacity)	27.5	—2.5
Automobile production (number of cars and trucks)	85,763	—410
Railroad loadings of forest products (number of cars)	28,021	+2,904
Pittsburgh industrial production and shipments (index number)	57.2	—3.2
Construction contracts awarded (total value)	$31,873,000	—$9,807,000

Components of The Index (1) Steel Ingot Production Rate, from THE IRON AGE; (2) Automobile Production, from Ward's Automotive Reports; (3) Revenue Freight Carloadings of Forest Products, from Association of American Railroads; (4) Industrial Productive Activity in Pittsburgh District from Bureau of Business Research of University of Pittsburgh; (5) Heavy Construction Contract Awards, from *Engineering News-Record*.

THIS WEEK ON THE ASSEMBLY LINE

. . . Buick tunes production above 1100 a day with 85,500 new models scheduled by end of year.

o o o

. . . 26,000,000 man-days of work lost through labor disputes during last fiscal year, according to Secretary of Commerce.

o o o

. . . 60 UAW members arrested on traffic charges while distributing union paper at Ford River Rouge plant.

o o o

. . . Labor's Non-Partisan League votes to form state labor party on "principles of the labor unions."

DETROIT, Dec. 13.—With production held close to the current demand for new cars, Buick is making one of the most outstanding of all records for itself. While December output in most automobile plants is being sharply curtailed, Harlow H. Curtice, president of Buick, announces that his plants will turn out an average of 1122 cars a day. December schedules call for the output of 20,191 cars, bringing total production of 1938 models through Dec. 31 to more than 85,500 cars. This compares with 76,359 built in the corresponding period of last year, an increase of 12 per cent.

A total of 18 days will be worked this month at Buick, compared with 20 days in November, when 24,461 cars were produced, and 21 days in October, when output was 25,001 cars. The figure for this November is 980 cars greater than for November a year ago. This company entered the new season with something like 65,000 unfilled orders and reports that it still has a substantial bank, with sales at present exceeding those of a year ago. This one company stands out in sharp contrast to the rest of the industry which, with the exception of Ford, is contracting its efforts steadily because customer demand has slowed down. Complete new car registration figures for October give Buick fifth place in retail volume for the entire industry, whereas a year ago it was in seventh place.

Chevrolet, which was the high producer a week ago, has cut down from 27,500 cars to 20,000, accounting for a large part of General Motors' volume drop from 41,400 to 31,800. Plymouth held steady at 10,500 units, as did the rest of Chrysler volume, which dropped only 1100 to 19,600.

Ford Output Gains

As anticipated, Ford plants advanced from the 13,070 (revised) built a week ago to 22,615 units. Total output for the week, according to Ward's Automotive Reports, was 85,763, compared with 86,173 the previous week and 19,660 the corresponding week a year ago. Ward's estimates December production at 285,000, with 360,000 units estimated for November, compared with 405,702 last November. This ties in very closely with the Automobile Manufacturers' Association figure for November factory sales, which is 363,538.

On the basis of this A.M.A. estimate, November operations represented an 8 per cent increase over the preceding month and a 10 per cent decrease from November, 1936. Factory sales for the first 11 months of this year were placed at 4,656,530, a 14 per cent increase over the 4,097,316 units sold during the corresponding period of last year. December should bring the year's total very close to the 5,000,000 mark.

The last year's stoppages and industrial disputes are estimated to have cost employees 26,000,000 man-days of work. As part of this, Secretary of Commerce Roper estimates that stoppages in General Motors and Chrysler Corp. plants alone cost employees between 7,000,000 and 8,000,000 man-days of work before last June 30.

Union Asks 24-hr. Week

A plea was made last week by the UAW Chrysler locals to have

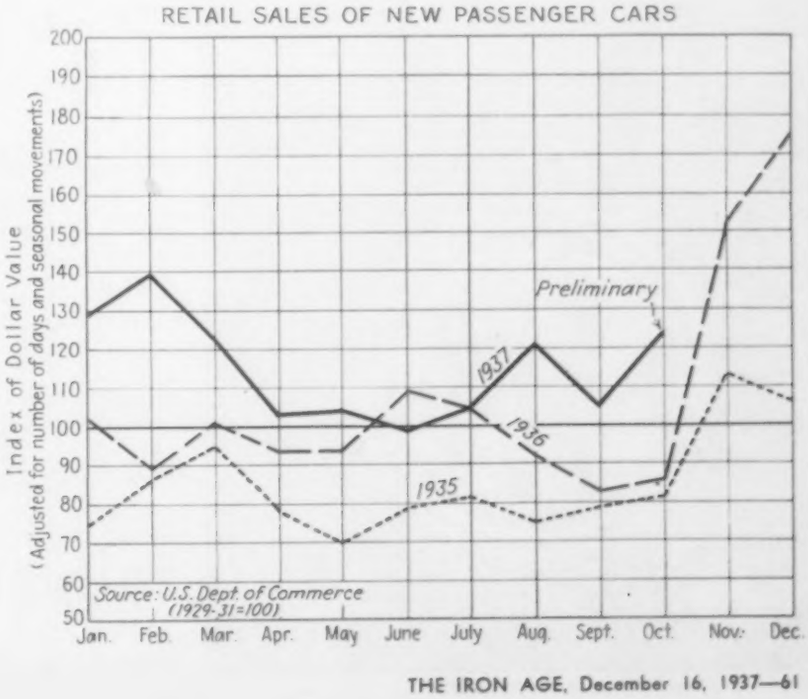
the work week cut to a minimum of 24 hr. during the present slack period so that more workers might be employed. At present the plants are working 32 hr. a week. This action followed a two-day session last week-end at which delegates from Chrysler plants made preliminary plans for their negotiations on a new contract with the corporation.

Another incident in the union's campaign to organize Ford workers occurred Wednesday when 60 members of the union were arrested on traffic charges as they attempted to distribute union literature at Gates 3, 4 and 5 on the Miller Road side of the Ford plant. The arrests resulted in a petition asking Governor Murphy to remove Mayor John L. Carey of Dearborn on grounds of official misconduct and neglect of duty. Meanwhile the arrested men are free awaiting the warrants which the Dearborn city attorney threatens to issue. The distribution and the arrests were staged principally to provide a test case. This is the first time any step has been taken to prevent distribution of the union paper from a public highway adjacent to the Ford plant, although last May 26 a battle between UAW organizers and Ford men resulted at Gate 4 when distribution of union literature was attempted on a Ford overpass. Mayor Carey's declaration that Gates 3, 4 and 5 were in a congested area, with literature distribution prohibited, was the first attempt to use such power in the industrial disputes around Detroit. Dearborn officials told the United Auto Workers that they could distribute literature at Gates 9 and 10 on the far west side of the River Rouge holdings. However, only a small part of the production workers leave by these gates, the majority using the parking space along Miller Road and entering through the gates on that side of the plant. Only a string of rapidly moving automobiles leaves through the western gates.

Arbitration Under Way

The first formal arbitration under the agreements between the automobile industry and the auto union got under way last Wednesday as Willard E. Hotchkiss, the arbitrator, sought to settle a dispute between General Motors and the UAW. The case involves alleged discrimination in the discharge of six men whom the company accused of dipping a fellow worker into a barrel of tar-like substance last June 10 at the Fisher Body plant in Pontiac. The story of one of the witnesses throws an interesting sidelight on the shop steward system. He testified that he joined the UAW in February and was named chief shop steward for the organization. He said that he was required to work the first hour of his shift each day and then was allowed four hours in which to settle grievances of the union workers.

Further political ambitions of the UAW are being formulated in sessions like that held Sunday by Labor's Non-Partisan League. Two



KELLER CUTTER AND RADIUS GRINDER

Keep your cutters at full cutting efficiency

Modern high speed machines depend on properly ground cutters to produce accurate work without chatter and inefficiency. Hand ground cutters cannot be expected to have flutes concentric with their shanks, with equal heights and correct radii. The Keller Cutter and Radius Grinder is particularly designed for the production and maintenance of shank driven cutters with square, ball or radius noses, cylindrical or tapered in shape. This machine insures increased cutting efficiency, improved cutter life and accurate work. Write today for complete information—free to any interested executive.

PRATT & WHITNEY

Division Niles-Bement-Pond Company · HARTFORD, CONN.

KELLER SALES DEPARTMENT

hundred fifty delegates voted to act jointly with other labor groups in the State for a meeting to consider the formation of a State labor party to be formed on the "same fundamental principles as the labor unions." The UAW nine-man political action committee which functioned in the last municipal election in Detroit was continued as a temporary executive committee with the addition of one delegate to be named by each local union joining the League. Action similar to this has been taken in Hamtramck, where the UAW has announced that it will enter politics actively this winter but without authority to any individual to pledge the UAW support to any candidate. The UAW feels that the 126,000 or more votes it polled for its own men in the last Detroit election offer hope for success in forthcoming campaigns.

Employment Level Lower

Employment in the Detroit area is reported at a level less than that of a month ago by 70 per cent of the members of the Purchasing Agents Association of Detroit. Twenty-five per cent of those reporting indicate that there has been no change. The industrial employment index of the Detroit Board of Commerce shows that the peak of local employment was reached Nov. 1, when the index stood at 124.9. By the middle of the month, it had dropped to 123.4 and by the end of the month had reached 115.1, approximately the same level as a year ago at the same date. Other statistics gathered by the Purchasing Agents Association indicate that general business is much less satisfactory than a month ago. In November 81 per cent of those giving their opinions saw a turn for the worse, compared with 41 per cent who expressed this attitude in October. Commodity prices were reported lower than a month ago by 52 per cent and the same as a month ago by 46 per cent. Decreased inventories were reported by 2/3 of the members. While up to a month ago Detroit businessmen have been reporting money to be plentiful, the change indicated in October has followed through this month and now only 67 per cent report ample credit. Twelve percent said "slow" and 2 per cent said "tight."

Weight reduction is revealed as one of the most important points in Buick's adoption of coil springs for rear suspension. Since most of the reduction is in unsprung weight, it results in improved riding and passenger comfort. In substance, this is one of the major benefits of coil spring rear suspension, according to Vern Matthews, Buick chassis engineer. A pair of Buick coil springs on the Buick 40 cars weigh 27.38 lb., as against 76 lb. for the former leaf springs. The entire 1938 rear spring assembly weighs 45.94 lb. against 107.01 lb. last year, the engineer said. The reduction in unsprung weight is from 391 lb. to 368 lb.

Packard Adds New Car

A new car has been added to the Packard Eight line. It is an eight-passenger sedan and limousine type now in production. Because this car will carry greater passenger loads than the regular Packard Eight, the chassis is equipped with a heavier rear axle, larger brakes, heavier frame and springs and larger tires.

The new small Italian car, introduced at the New York Show, the Fiat, has given American parts manufacturers a chance to add replacement equipment for these cars. These include tires by Firestone, Willard Batteries, Champion spark plugs, Auto-Lite head lamps and Tung-Sol Westinghouse Mazda Lamp bulbs.

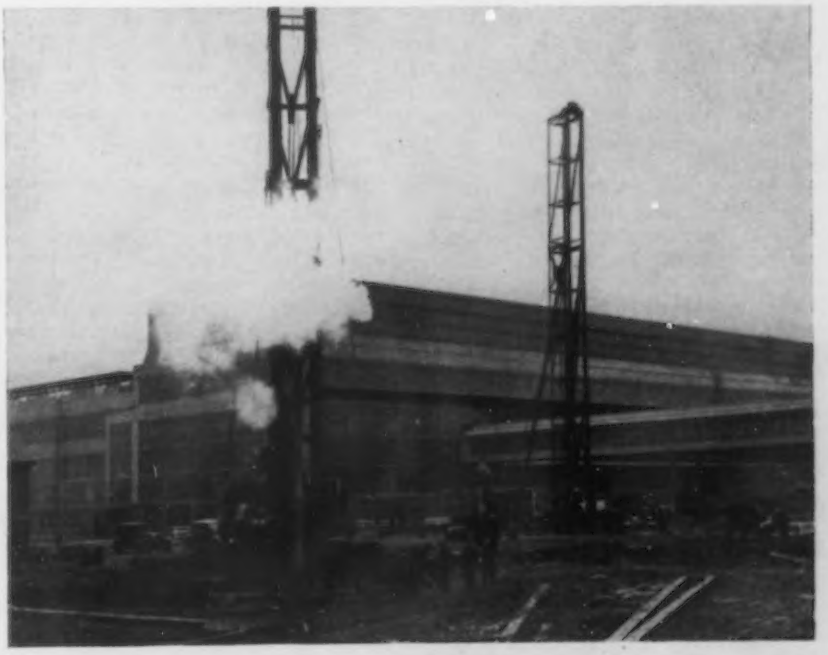
The manufacturer of last year's successful small American car, Willys, is paying another quarterly dividend. Directors of Willys-Overland Motors, Inc., have voted $48,116.70 to holders of 320,778 shares of outstanding $10 par value convertible preferred stock. With this payment for the present quarter, dividends on these shares since October, 1936, will total nearly a quarter million dollars. Another dividend declaration is that made last week by the directors of the Yellow Truck & Coach Mfg. Co., a General Motors division. The dividend is payable Dec. 23 and follows a $1.75 dividend declared Nov. 17 and $5.25 per share previously paid this year, a total of $21 a share. Dividends in arrears on this stock, dated Dec. 31, 1937, will amount to $14 a share.

Cowling Resigns

Able-salesman W. C. Cowling, Ford Motor Co. sales manager and an employee of the company for 23 years, has resigned to enter private business. Cowling entered the employ of the Ford company in the traffic department in 1913 and rose to the head of that department before his transfer to the sales division.

Now it can be told that Cowling professed no prophetic eye for the 1938 outlook. At one of the press previews he said, "All I know is that between now and the first of the year we'll build all the cars we can. After that—well, for the first time in 23 years in this business, I guess I don't know."

THE first pile was driven last week at the Ford Rouge plant to start the Ford Company's $40,000,000 building program. The pile driver is the first of seven to go into action on the site of the first new building scheduled. Seven pile drivers during the next three months will drive 20,000 tons of steel piles, some 107 ft. long, to hard strata to support building foundations and foundations for heavy machinery. Ford recently awarded contracts for the steel piling and for 25,000 tons of structural steel for the building itself.



WASHINGTON. . . . . .

. . . NLRB attack on freedom of press stirs Congressional critics to ask for investigation.

o o o

. . . President urges quick relief for railroads, but ICC denies carriers' emergency plea.

o o o

. . . Federal Reserve Governor Eccles declares labor contracts have added to price rigidity.

o o o

By L. W. MOFFETT
Resident Washington Editor
The Iron Age

o o o

WASHINGTON, Dec. 14.—Shades of the once potent Blue Eagle! Amusing and sour memories of the old bird's delirious heydey, when to ruffle its feathers even slightly was seditious in the mind of its zealous keepers; when mild criticisms, written or oral, often meant imperial lectures for the critics; when a York, Pa., battery maker, trying to maintain employment, was tossed into jail because he could not adhere to a more or less sacred code; when a New Jersey pants presser went to durance vile for knocking a nickel off the code standard.

Conjured are these thoughts of crazy-quilt bureaucracy by the grotesque antics of the National Labor Relations Board. It seems to be hell-bent and well on its way toward outdoing the unlamented NRA when the latter in high fervor of a crusading regimentation, laid down the Draconian law to industry. The NRA was saved from itself and industry was saved with it—by a merciful Supreme Court in its famous "horse and buggy decision."

NLRB and the Press

But high and mighty as the Blue Eagle became in its topmost flights of fancied power, the NLRB is attempting an even greater degree of domination. For it seeks not only to tell industry where to head in, via the CIO route, with respect to labor relations, but to gag that section of the press—and it is a large section of both the daily and trade press—which opposes the board's policy.

Vigorous denials to the contrary, this is the almost universal conclusion of press criticism of the board's high-handed tactics toward two editors, Harry T. O'Brien of the St. Mary's, (Pa.) *Daily Press*, and Hartley W. Barclay of *Mill and Factory*.

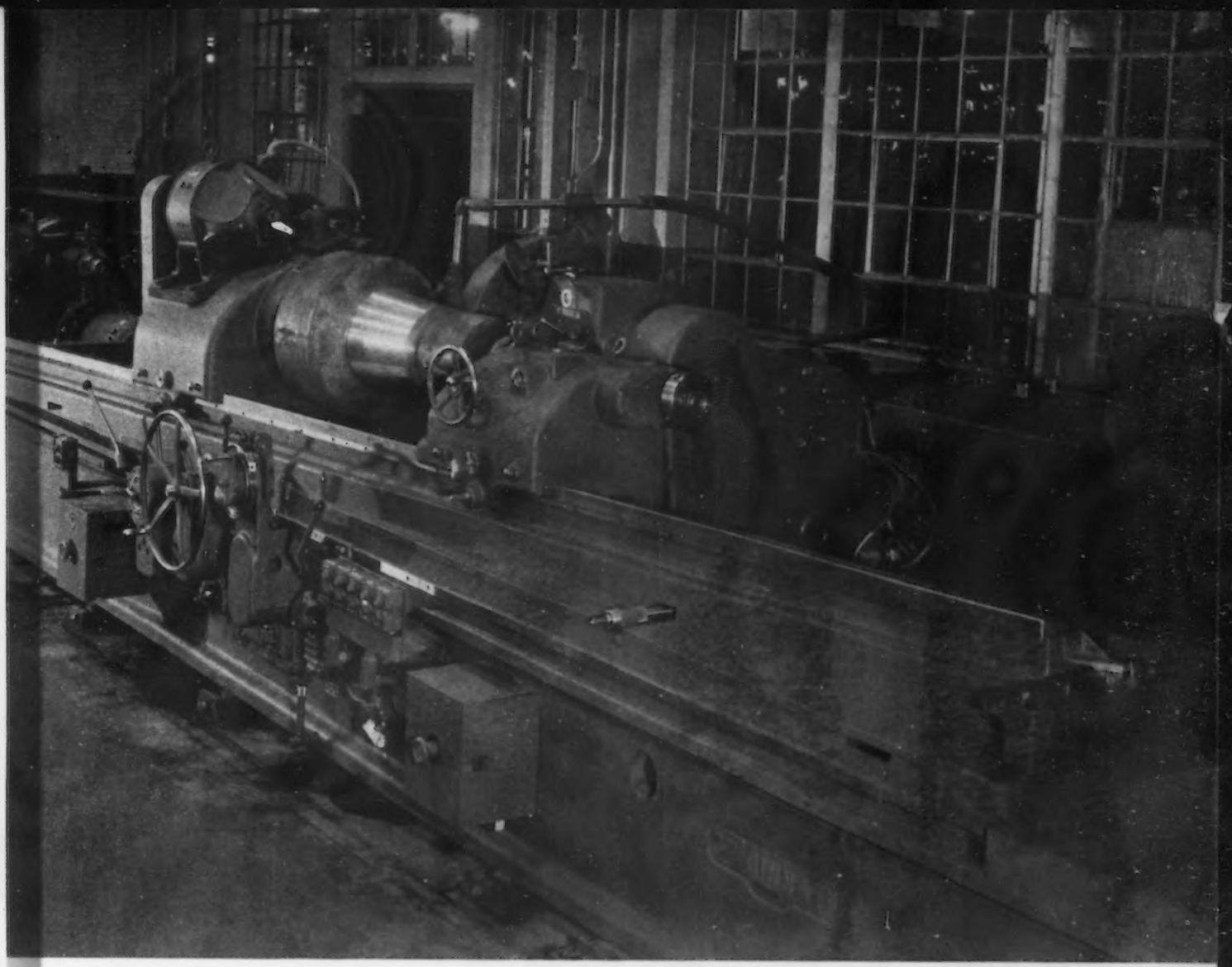
Because these editors attacked the NLRB policies they are placed under subpoena by the board. Mr. Barclay, determined to stand on his constitutional rights, disregarded the subpoena which called for his appearance at a hearing in Steubenville, Ohio. So the case has been put directly up to the NLRB in Washington. Mr. Barclay's attorney, Elisha Hanson, manifestly turns to the first constitutional amendment in defense of his client —in defense indeed of democratic government and in opposition to a dictatorship. This amendment, supremely fundamental to the liberty of any people, bars Congress from enacting any law "abridging the freedom of speech, or of the press."

Denies Curbing Press

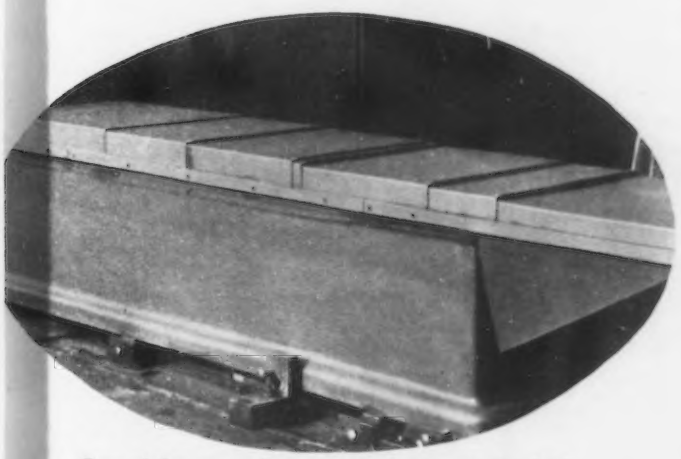
The NLRB, seeking a way out, strongly denies it is trying to curb the press. It is only—so it says in effect—seeking evidence of alleged coercion of employees by employers. The attempted tie-in is that the Barclay and O'Brien articles were sponsored by employers and distributed among their employees. The NLRB naively points out that it acted under the broad Wagner Act provision giving the NLRB authority "to issue subpoenas requiring the attendance and testimony of witnesses and production of any evidence that relates to any matter under investigation or in question before the board," etc.

It was only the nature of distribution of the Barclay article among Weirton Steel Co. employees that concerned the NLRB, so it said. It was not the nature of the article at all, so it was urged, the broad-gaged board not caring one whit about criticism, per se.

But the veneer of this contention was abruptly punctured by the revelation, made subsequent to issu-



One Setting Does the Job



One of the many factors contributing to the faithful reproduction of hair-splitting accuracy—the telescoping tableway guards. Dirt stays out and accuracy stays in. Write for catalog G-383.

Tapers are just as easy to grind as straight or cambered cylinders . . . on the CINCINNATI Roll Grinder. Once set up for the correct taper, there's no need to reset for dressing the wheel. The hydraulic wheel truing attachment is built into the wheelhead, and operates independently. You can dress the wheel as often as necessary without disturbing the work or swivel table setting in any way. Cincinnati Grinders Incorporated, Cincinnati, Ohio, U. S. A.

CINCINNATI

MILLING MACHINES *and* GRINDING MACHINES

ance of the Barclay subpoena, that an examiner and attorney for the NLRB had submitted Mr. O'Brien to an inquisition because he had criticised the NLRB policy. So amazing was the quiz to which Mr. O'Brien was put that were it not a fact it would be difficult to believe it could have taken place. It was persecution. And undoubtedly Mr. Barclay had been spotted for a similar grilling. Were not the principle involved so serious, one could get light comedy out of the affair almost as amusing as are the ex parte NLRB hearings themselves. For how can one suppress a smile at the NLRB's elaborate subpoena which required Mr. Barclay to produce copies of all letters, memoranda, telegrams, radiograms, reports and other communications used in preparing his article. Also the original and "revised" proof sheets were called for along with other minutia. Probably through oversight no demand was made to bring along the office cat and the galley boy. But it would have been fitting with the whole remarkably inept, amateurish proceeding which gives final evidence, if any were required, that the NLRB is badly in need of a new personnel.

The Wagner law itself has been raked fore and aft with strong sentiment in industry—and in the AFL—for its revision. Yet the act does not tamper with the freedom of the press. Protest in the present case is against abuse of power given under the act that has prompted the NLRB rampage.

But if the NLRB does have the power it affects—which means curbing press criticism—then one gets a sympathetic understanding of how Mr. Bumble felt when he said "If the law supposes that, the law as a ass, a idiot." (Oliver Twist.)

Machine Tool Orders Drop 16 Per Cent

SHOWING a decline for the third consecutive month, the combined index of foreign and domestic machine tool orders for November stands at 127.7 per cent of the 1926 average, according to the National Machine Tool Builders' Association. The November figure represents a decline of 16 per cent from the October index of 152.0, and 54.8 per cent from the year's high of 282.5 in April.

In November foreign orders were in greater volume than domestic orders for the first time since December, 1933. Standing at 64.4, the foreign index is 1.1 points above October's level, and 1.5 points above November's domestic index. The index of domestic orders in November is 63.3 per cent of the base average, a drop of 25.8.

Congressional Critics Want Investigation

CONGRESSIONAL critics of the National Labor Relations Board, encouraged in their fight to draft a more equitable labor relations law as a result of charges that the board is moving to control the press, are pressing for investigation of the quasi-judicial agency.

Senator Edward R. Burke, Democrat, of Nebraska, requested the judiciary committee to inquire into allegations that the board has been partial to the CIO and has threatened to infringe on freedom of the press. Both Republicans and Democrats are expected to be participants.

"The Labor Board, conceived with the best of objectives, has worked out so that even its closest friends are apologizing for it," Bridges said. "It is probably one of the most lopsided Government agencies ever created because employers have no rights before it and it is prejudiced toward one arm of labor."

Meanwhile, the CIO-AFL rift continued to plague the board. For the second time within two weeks, it split on the question of recognizing a craft union over the industrial type of union as sponsored by John L. Lewis. It upheld the collective bargaining rights of a craft union at the Worthington Pump & Machinery Corp., of Harrison, N. J., in a three to two decision.

Although the SWOC had a contract and held that workers in the plant should be considered as one unit, a majority of the board upheld the AFL theory that skilled workers must be afforded individual representation.

Board member Edwin S. Smith cited his earlier dissents in the Allis-Chalmers Mfg. Co. and the Schick Dry Shave Co. cases in substantiating his reasons for favoring a plant-wide unit. He said:

"In this plant of 1800 employees, there was up until the coming of the SWOC no effective labor organization. The association had succeeded in organizing about 20 per cent of the wood pattern makers, but the record is silent as to any effective bargaining between the company and this minority group.

"With the advent of the industrial union, labor organization gathered headway rapidly in the plant; at the time the SWOC made its agreement with the company in May about 95 per cent of the employees had affiliated with it. The union of pattern makers, which had remained for many years on an ineffective basis, now achieved

a sudden spurt as a result of the general enthusiasm for organization created by the SWOC. . . .

"There seems no special warrant in the claims put forward by the association for weakening collective bargaining in an industrial unit by depriving the unit of the strength of this group of skilled workers."

Michigan Bolt & Nut Co., Inc., has moved its sales offices and warehouse from 7545 Russell Street to larger quarters at 2667 East Grand Boulevard, Detroit.

President Wants Early Aid For Railroads; ICC Denies Emergency Plea

WASHINGTON, Dec. 14.—President Roosevelt at his press conference last Friday said the sooner railroads get a determination of their pending rate case the better, adding that that is all he could say at this time.

The President's remarks were taken to be favorable to the railroads, though contrary to widespread views they do not necessarily mean they will hasten an ICC opinion nor assure rate increases. However, both a comparatively early decision, perhaps next March or April, and substantial rate increases are being freely predicted.

Action of the commission on Saturday in moving up the hearing date on final arguments from Feb. 7, the date previously set, to Jan. 17 was believed to have been prompted by the emphasis placed on the railroads' financial plight together with the President's remarks the day before.

But the matter of an immediate rate increase is definitely out of the picture. This was made evident when the commission last Friday denied the railroad petition of the day before asking for an immediate rate increase.

Asked about his conference the preceding day with RFC Chairman Jones, the President said that the problems of one or two individual roads had been discussed where there appears to be need for temporary financing pending the outcome of the ICC decision. He said the amounts involved would be small, however.

Questioned specifically as to what the Government could do for the railroads and if it is entirely in the hands of the ICC, Mr. Roosevelt said that the first responsibility rests with that agency. He described the railroad situation as the most difficult the country faces in many ways and referred newsmen to Joseph Eastman's report made when he was Coordinator of Transportation to illustrate his point that nobody in the ICC thinks they have a permanent solution of the problem.

Opposes Government Ownership

The last thing the Government wants to do is to take over the roads, the President continued, but obviously many of the roads cannot continue to function while in receivership. He listed their difficulties as (1) financial; and (2) competition. He elaborated on the second category, explaining that it had been growing up over a period of years because shippers in vari-

our communities felt that if they had two railroads to choose from they would get better service even though the rates were the same. That situation was allowed to continue, he added, even though in many cases one road could have handled the whole business.

He said he believed the country was coming to a gradual reduction in competition among roads and that if that is the trend it can only mean further consolidations and abandonment of more tracking. He said it was his view that a large railroad mileage should be abanboned. Economically, it just can't continue otherwise, the President said.

Mr. Roosevelt said the Government had no specific plan for remedying the railroad situation and pointed out that because the ICC is principally charged with the problem, any plan that has as its objective the assistance to private management and private ownership and finding a solution to restore solvency ought to originate with that agency. You can't keep a road in insolvency forever, the President added.

Asked to comment on Jesse H. Jones' statement that subsidizing the carriers might offer a solution, Mr. Roosevelt retaliated with another question. Why not cotton mills and others, he asked, adding that in following such a course, you would be working toward state socialism.

U. S. May Build Up Manganese Ore Stock

WASHINGTON, Dec. 14.—"An emergency stockpile of more than a million tons of manganese ore, valued at approximately $40,000,000, will be purchased by the Government if present recommendations of the War Department and the Military Affairs Committee of the House carry through," J. Carson Adkerson, president of the American Manganese Producers Association, has stated.

"The highest grade manganese ore in the world's market is today being produced from formerly worthless low grade material at Butte, Mont., and is being shipped to ferromanganese manufacturers in the East at the rate of more than 100 tons per day.

"The United States Bureau of Mines has recently developed at Boulder Dam an electrolytic process for the recovery of relatively pure manganese from the abundant reserves of low grade ores in the United States.

"A large portion of the ore for the Government stockpile will likely be mined from deposits in Alabama, Arizona, Arkansas, California, Colorado, Georgia, Idaho, Minnesota, Montana, Nevada, New Mexico, North Carolina, Oregon, South Dakota, Tennessee, Texas, Utah, Virginia, Washington and West Virginia.

"The present proposal is for the ores to be purchased from foreign sources. Domestic producers, who have for years clamored for a market and the opportunity for further development of domestic deposits to meet just such an emergency, now demand that the purchases be confined to the United States for employment purposes as well as national defense.

"The production of a million tons of manganese ore will provide direct employment for more than 68,000,000 man hours of labor, covering widespread rural and mountainous areas in the United States."

Labor Contracts Add To Price Rigidity According To Marriner S. Eccles

WASHINGTON, Dec. 14.—Marriner S. Eccles, Chairman of the Federal Reserve Board and the power behind the throne in the Administration's projected large-scale housing program, told members of the Senate Banking and Currency Committee last week that price rigidity and an increased number of labor contracts was responsible for the building slump in the last eight months and that both are the result of the NRA program.

"I would say there is far more rigidity in the prices today than there has possibly been in the past," the Reserve Board chairman testified during hearings on the housing bill introduced by Senator Wagner, Democrat, of New York, which incorporated features proposed by the White House. "I think the NRA possibly might have contributed to making possible that situation. Labor is much more thoroughly organized, and there are many more labor contracts than there were before. Those factors contributed, of course, to the rigidity of prices."

Describing high prices as the "underlying cause" of the present business decline, Eccles discounted the idea that prices are uniformly rigid, but rather, he said, they reflect " a lack of balance." Citing what he called the group with "fixed incomes" whose earnings he said did not go up in proportion to increased business profits and in proportion to the income of organized labor, Mr. Eccles said increases in income also lacked uniformity and that as a result construction costs soared more rapidly than in almost any other field.

Eccles Refers to Steel

Prices as a whole were not too high in the spring, Eccles said, explaining that the price index was still considerably below the 1926 level. Again referring to "the lack of balance" in prices, he cited steel, for example, which he said was 20 per cent above 1929 prices. (THE IRON AGE composite price shows present prices at 2.605c. a lb. as compared with a 2.317c. a lb. peak in 1929, or an increase of 12.4 per cent.)

Eccles told the committee that prices in some fields are coming down but that the reduction is slow in reaching the consumer. Lumber, he said, is averaging at the mill 25 per cent less than it was 90 days ago and is selling "below any possible cost of production." He attributed the drop in price to the excess of supply over demand.

Recognizing that sales below cost cannot continue, Eccles suggested as a possible remedy obtaining sufficient volume to sell at lower prices. But he qualified his statement by pointing out that even though prices dropped considerably as a result of obtaining maximum volume, the cost is tied into the freight rates, which he said are about equal to the value of the lumber on board cars from Oregon to the Eastern markets.

"But if we can get the volume there is also the hope and the possibility that labor may be willing to take a less hourly wage with the assurance of a greater annual wage," Eccles asserted, adding that he would favor an annual wage "if it could be brought about."

Green Opposes Annual Wage

William Green, president of the AFL, turned thumbs down on that suggestion when he appeared before the committee a few days later. He said that any reduction in building costs resulting from an annual wage plan will be "purely nominal" since it would be offset by increased overhead and operating charges. Green took the position that an annual wage would aggravate rather than relieve unemployment; would seriously dislocate and cripple construction activity; and would undermine the industry's wage structure with resultant economic instability and social discontent.

Characterizing the high cost of home financing as "the most important deterrent to building construction," Green said the largest portion of economic waste in the building industry is still attributable to the practice of competitive bidding despite "some improvements."

"When considered together with other factors in the cost of construction . . . it is difficult to understand how the current building lag can be attributed to the wage levels secured and maintained in this in-


PRESSED STEEL
with
SALES APPEAL!
TRANSUE ENGINEERS have established a recognized reputation for their ability to reproduce designs, in pressed steel, that give the finished product "sales appeal."
Which, backed by the latest equipment for uniform production, on-time delivery and low unit cost, is making "Stampings by Transue" a major specification in many plants in many industries.
Of the many recent examples of sales appeal in pressed steel produced by Transue presses . . we have space for only one . . a unit heater that is now so popular in industrial installation that you'll probably recognize it.
TRANSUE & WILLIAMS
ALLIANCE, OHIO
Sales Offices
NEW YORK · PHILADELPHIA
CHICAGO · INDIANAPOLIS
DETROIT · · CLEVELAND
TRANSUE
Designers and Makers of
DEEP DRAWN STAMPINGS

dustry by building machanics and building laborers," Green said.

Asked by Senator Wagner, chairman of the committee, if "monopolistic practices" as well as labor costs had not resulted in high prices irrespective of demand, Eccles replied that he had found that "prices do not come down very rapidly in certain fields of activity." He concurred with Wagner in the statement that wage increases had resulted in price increases of twice the size of the increase, adding:

"Where you have what we call a seller's market—where the demand is apparently greater than the immediate supply such as we had last year because of a lot of forward buying—the prices always go up without regard to cost. Business has never been averse to taking all the profit it can get at a given time; and it is unfortunate that prices were advanced in many fields belond the immediate requirements based upon increased costs. But that is what has happened."

Bethlehem's New Bar Mill Running

BETHLEHEM Steel Co. is operating at about 27 per cent and there are no indications yet of any increase in new business, Eugene G. Grace, president, said last week following a directors meeting in which a year-end dividend of $1 was declared on the company's common stock.

The new rod and bar mill at Sparrows Point, Md., with an annual capacity of 240,000 tons, was put into capacity last week and the new sheet strip mill at the same plant, placed into operation two weeks ago, is now in commercial production, Mr. Grace said.

With completion of its plant-building program, Bethlehem will begin 1938 with a tonnage rating in excess of 10,000,000 tons of steel products, compared with 9,360,000 tons a year earlier, he said.

Demand for Special Rolling Stock Met

INCREASING types of specialized rolling stock are being provided by railway equipment manufacturers to meet needs of industry, V. R. Willoughby, general mechanical engineer of the American Car & Foundry Co., told the New York chapter of the Railway and Locomotive Historical Society meeting last week in New York.

He cited lead-lined tank cars provided for shipment of acids, rubber-lined tank cars for muriatic and phosphoric acid and formaldehyde, and nickel clad cars for caustic soda. "Liquid sodium," he said, "is now shipped in especially designed welded tanks, with air excluded by nitrogen, and is allowed to solidify, being melted at the destination by circulating hot oil through coils welded to the outside of the tank shell."

Bids Are Requested on 100-Passenger Planes

REQUESTS for bids on airplanes capable of carrying 100 passengers, cruising 5000 miles at 200 miles an hour, and transporting a 25,000-ton payload, to maintain American supremacy in trans-Atlantic flying have been sent by Pan American Airways to eight leading aircraft manufacturers. Preliminary bids are to be submitted by March 15 to Charles A. Lindbergh, chairman of Pan American's technical committee. Known as the Yankee clippers, the planes would be the largest in the world.

Price Maintenance Act Forces FTC to Abandon Prosecutions

WASHINGTON, Dec. 14.—Enacted into law against the recommendation and over the veto of President Roosevelt, the Tydings-Miller Resale Price Maintenance Act is forcing the Federal Trade Commission to abandon complaints alleging price fixing relating to standard brand products. Presidential fire was directed at the legislation last April when it was pending in Congress and was based on a report of the FTC made to the President at his request in which the FTC roundly scored the measure. The FTC told the President that, "There is great probability that manufacturers and dealers may abuse the power to arbitrarily fix resale prices by unduly increasing prices, resulting in bitter resentment on the part of the consuming public, especially in this period of rising prices."

Quoting this statement, the President said that "since we seem to be in a period of rising retail prices, this bill should not in my judgment receive the consideration of the Congress until the whole matter can be more fully explored."

He suggested without avail that Congress might approve having the FTC "bring down to date the study it made eight years ago by examining the economic effects of resale price maintenance under the novel and rapidly changing conditions now attending business in this country."

The bill was shoved through Congress by pressure. The often-used "rider" tactic was the weapon; Senator Tydings of Maryland tacked the measure as an "amendment" to the District of Columbia revenue bill.

There are reports that, when it frames its anti-trust legislation, the Administration will attempt to have the law repealed.

It was because of the act that the FTC last week announced dismissal of three complaints, one against a drug manufacturer, another against the Gillette Safety Razor Co., and a third against a manufacturer of toilet preparations.

The Tydings-Miller Act, approved Aug. 17, 1937, makes legal contracts or agreements prescribing minimum prices for resale of standard brand products when such contracts or agreements are lawful as applied to intrastate transactions under the laws or public policy of any State in which such resale is to be made, or to which the commodity is to be transported for such resale. The Tydings-Miller Act, however, applies only to contracts made between the manufacturer and wholesaler or retailer. It bars horizontal contracts or agreements between competing manufacturers, wholesalers or retailers. There are 42 States having resale price maintenance laws. There are no such laws in the District of Columbia, or in the six States: Alabama, Delaware, Mississippi, Missouri, Texas, and Vermont.

Sale of Leviathan for $723,000 Approved

THE Maritime Commission at Washington has approved sale of the *Leviathan* for $723,000 to Metal Industries, Ltd., Glasgow, Scotland, and Thomas Ward, Ltd., Sheffield, England. The vessel, once largest ocean liner, will be broken up for scrap at Glasgow.

E. T. Weir Urges Country To Try "Collective Cooperation"

VIGOROUS enforcement of laws against violence, intimidation and coercion and drastic amendments to the Wagner Act were proposed by Ernest T. Weir, chairman of National Steel Corp., at the National Association of Manufacturers convention held last week in New York.

Placing part of the blame for labor troubles on the Roosevelt Administration, Mr. Weir said the present Government attitude was "one of the biggest stumbling blocks to a rational get-together of capital and labor."

His address, made after the more than 2000 industrialists at the gathering approved a list of labor recommendations, criticized the expression "collective bargaining." "In those two words lies much of the controversy which has cost society so much in recent years," he said. "It is the term 'collective bargaining,' not the theory of employees choosing their own representatives, that is discordant.

Collective Cooperation

"The popular and prevalent implication of the word 'bargaining' is horsetrading, one group trying to get the better of another. If we could substitute the idea of 'collective cooperation' we would take one of the most forward steps that has ever been made in industrial relations.

"I, for one," said Mr. Weir, "believe that capital and labor can get along. Eventually the workers of this country, if freed from the high-pressure influence of alien interests, are going to have exactly the kind of labor relations they want."

Following Mr. Weir's talk, Charles Fahy, general counsel of the National Labor Relations Board accused the manufacturers of "trying to put the labor unions out of business." "Collective bargaining is essential to the well-being of the employees," Mr. Fahy said. "It is essential to the self-respect of our industrial system but it cannot exist in the face of employer coercion of the individual employees in their choice of bargaining agents."

Board Stands Fast

The Labor Board attorney gave his listeners little hope for a more lenient attitude by the present Labor Board to employers.

Principal points in the labor platform recommended by the industrialists follow:

Workers may choose their own form of employee organization, but employee organizations must be free from coercion from any government agency.

Authorities should protect the right to engage in "lawful strikes," but their primary obligation is protection of the right to work. Laws against violence, intimidation and coercion should be vigorously enforced.

There is no justification for the closed shop or strikes to obtain it.

Compulsory collection of union dues by the "check-off" should be condemned.

Employees should be treated on the basis of merit and service without regard to union activities.

Compulsory government arbitration of labor disputes is "un-American."

Business men are entitled to the same protection in peaceful occupation and use of their property as any other taxpayers.

Government should not intervene in

the internal affairs of labor unions except to protect members from fraud or coercion or to determine whether labor unions actually represent those they claim to represent.

Amend the Act

The National Labor Relations Act should be amended so that no employer can be penalized for failing to deal with any labor organization which maintains sit-down strikes, general strikes, strikes to prevent the use of materials, equipment and services, strikes in violation of employment agreements, strikes to compel establishment of the check-off or to prevent, compel or terminate the employment of any person because he is or is not a member of any organization.

Courts should be permitted to dispense "preventative" justice in labor disputes.

Federal and state governments should outlaw money gifts both from corporations and labor unions.

The Byrnes "anti-strikebreaking act" should be amended to outlaw interstate transportation of "strike-makers" as well as "strikebreakers."

Every employer should have a sound company employment relations policy.

...OBITUARY...

EUGENE J. BUFFINGTON, director of the United States Steel Corp. and former president of the Illinois Steel Co., died in Chicago on Dec. 9, following an operation. A graduate of Vanderbilt University, of which he was a trustee, Mr. Buffington served for 34 years as president of the former Illinois Steel Co., and for 15 years as a member of the United States Steel Corp. directorate.

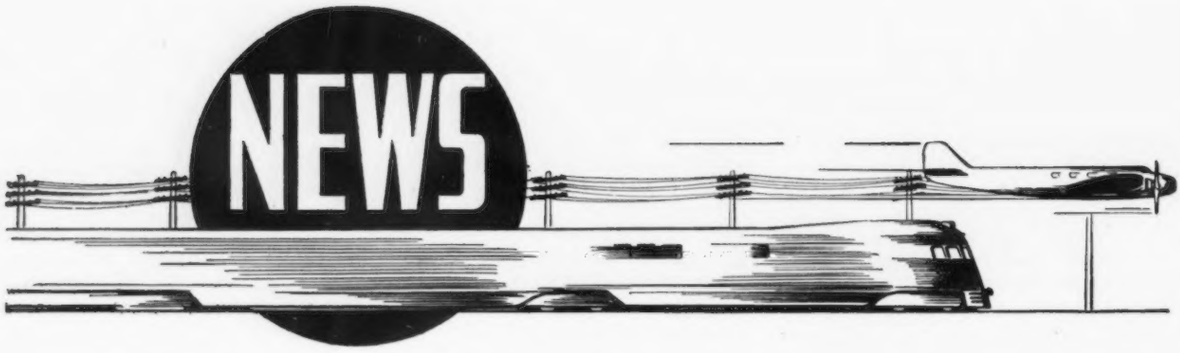
Mr. Buffington became identified with the iron and steel industry as director and treasurer of the American Wire Nail Co., Covington, Ky. When the American Steel & Wire Co. acquired the Anderson plant of the Wire Nail company in 1898, he continued as director and member of the executive committee. In January, 1899, he succeeded John W. Gates as president of the Illinois Steel Co., from which he retired July 1, 1932.

EUGENE J. BUFFINGTON

❖ ❖ ❖

REUBEN E. APTEKAR, assistant general superintendent of foundries of the American Brake Shoe & Foundry Co., New York, died on Dec. 4 after a brief illness, aged 37 years. He was a graduate of the University of Michigan and

(CONTINUED ON PAGE 93)



Cartel Committee Working on Agreement With American Mills

LONDON (*Special Correspondence*).—Discussions are now taking place in London in connection with the proposed cooperation of the United States steel industry with the European Steel Cartel. These discussions are a sequel to the agreement in principle which was reached at the recent Paris conference of the cartel.

The American manufacturers are favorable to an understanding on overseas markets in respect of steel products, with the exception of hoops, strips and sheets. At the same time they insist on European producers taking into account steel trade practice in the United States. To this end a sub-committee has been appointed by the cartel to compare costs and selling quotations ruling in the United States and on the European markets and to submit proposals for cooperation. It is this body which is now meeting in London. There are present representatives of all the countries signatories to the cartel.

The sub-committee will prepare a report which will be submitted to a full meeting of the cartel at Dusseldorf before the end of the year.

The London discussions are understood to be of the frankest possible nature. Among the subjects considered has been the stabilization of prices in export markets and what allowances will have to be made to United States exporters on account of "extras." No immediate reduction in prices is anticipated as a result of these meetings, but it is hoped that the price struggle will be ended. Certain countries, where competition was particularly strong in the case of sheets, have agreed to make concessions.

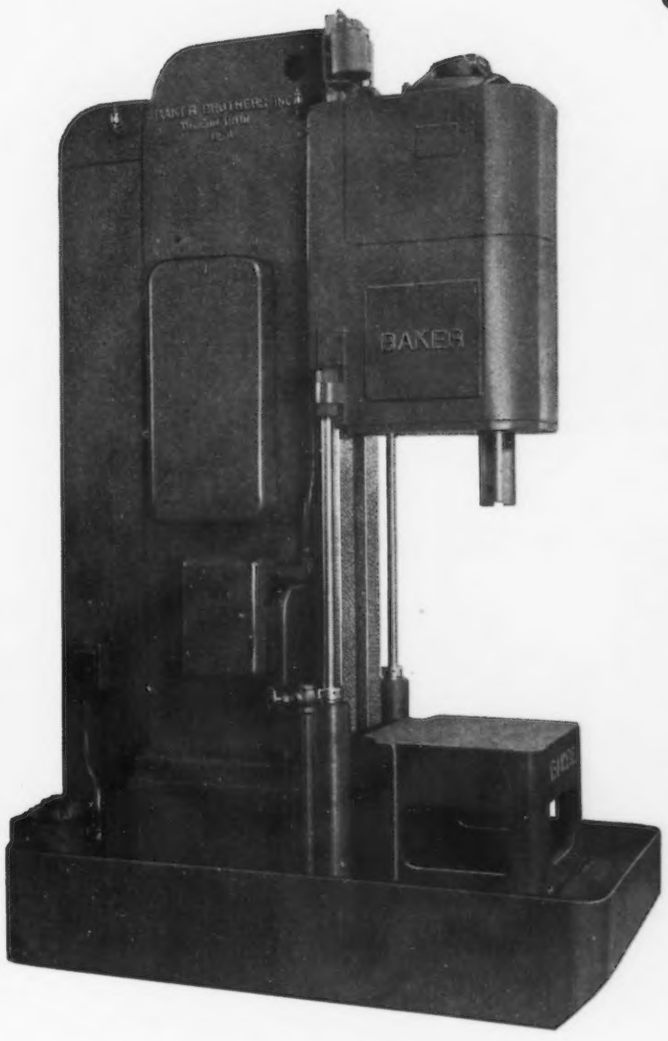
Ship Plates Reduced

It is also reported that the export prices of ship plates have been reduced by £2 to £14 per ton.

At the Paris conference agreement is believed to have been reached concerning additional deliveries of semi-manufactured steel to British works during the first quarter of 1938. Form orders are said to total 75,000 tons, but the buyers have the option to take an equal quantity, making a potential aggregate amount of 150,000 tons. German newspapers claim that

NEWS AND MARKET INDEX

Details Count



30 HO
capacity up to 25 H.P.
max. feed pressure 23,500

Carefully considered details of Baker machines are the basis for their better production performance.

The standard 30 HO hydraulic feed machine (illustrated) shows the usual sound Baker design. Important details that insure accuracy, speed and long life are also included. Automatic lubrication, helical gears in head, multiple splined spindle mounted on preloaded ball bearings, patented "Twin Pull" feed, and lower drive to spindle—these are not necessary for an ordinary machine. They are, however, required to meet Baker performance standards.

The 30 HO is provided with pick-off gears for speed changes; is totally enclosed for safety and easy maintenance; and can be furnished with multiple head, indexing table and special fixtures for special requirements. It is one size of a complete range of standard machines.

For your drilling, boring, tapping, and reaming requirements, consider machines built for better performance. Submit a blueprint or sample part for a recommendation by our engineering department.

BAKER BROTHERS, INC., Toledo, Ohio
Newark, N. J., office, 1060 Broad St.

★BAKER★

only Western European works are participating in this agreement.

S. W. Alexander, one of the chief critics of British steel policy, says in the *Evening Standard* that Britain is "trying desperately hard to tighten up the International Steel Cartel and to get the Americans in."

"The weakness of attempts like this to maintain export prices," he declares, "is that if the export price is too high in relation to internal prices it results in a larger quantity of steel going into goods for export in the manufactured form. Thus, although the steel makers of this country might appear for a time to get an advantage they would, in fact, lose in the long run because foreign manufacturers would build up their industry under the umbrella of an artificial international price level."

Another prominent critic of the policy of the British Iron and Steel Federation is Arthur Chamberlain, chairman of Tube Investments, who referred at the company's annual meeting in Birmingham to the recent announcement that present prices will hold good until the end of 1938.

Argues for Lower Prices

"We have been informed," stated Mr. Chamberlain, "that this was a public spirited action, taken in the face of great uncertainty as to the cost of raw material, to give confidence and stability to all users of steel and iron, and so to endeavor to put a check on that recession in trade activity which we are told is already operative in the United States, and with which we are also threatened in the next 12 months.

"If so, it is an action both wise and worthy of our admiration. It would have been wiser, more certain of achieving its announced aim and more worthy of our admiration if they had announced an immediate reduction in price. Personally, I read the omen differently. I think that they have begun to realize that the recession in trade with which some people think we are threatened is in part caused by the prohibitive cost to industry of their goods, and that this is a desperate but, in my opinion, futile attempt to maintain their exorbitant prices as yet a few months longer. I hail the announcement as heralding an imminent drop in steel prices, which they fondly hope to postpone by a show of trade solidarity that they really fear will not stand up against the hard facts of supply and demand."

Against this viewpoint, the federation declares that the decision to stabilize the majority of basic and hematite steel products for 1938 was taken with the full concurrence of the Import Duties Advisory Committee. It was a step taken, to use Mr. Chamberlain's own words, "to give confidence and stability to all users of iron and steel."

No Signs of Slump

With regard to Mr. Chamberlain's reference to a trade recession, it is claimed that there are no signs whatever of an abatement in the demand for steel products taken as a whole. This view is supported by the report of the London Iron and Steel Exchange on semi-finished steel, which says that "the whole production of the British works, supplemented by imports, is not sufficient to meet the full requirements of the consuming industries." Most of the steel works, the report adds, have enough work in hand to keep them busy for several months. There is little surplus of foundry iron from which to build up reserves.

Large Fence Contract to Take 1500 Tons of Steel

ANCHOR POST FENCE CO., Baltimore, which recently received an $188,000 order covering 55 miles of 6-ft. chain link fence to be erected around the reservoirs and on both sides of the open sections of the Colorado River aqueduct in the Imperial Valley Desert, will manufacture the fence at the Baltimore and Los Angeles plants. The main plant at Baltimore will be kept in operation for 45 days on a two-shift basis to complete the job, as the fence must be erected in place by May 1, 1938.

William F. Brannan, president of the company, says that he believes this to be the largest fence contract ever awarded in the United States. More than 1500 tons of steel will be required. The award was made by the Metropolitan Water District of southern California, which has built the aqueduct to bring water from Parker Dam to Los Angeles and vicinity.

MONTHLY SHIPMENTS OF FINISHED STEEL PRODUCTS BY UNITED STATES STEEL CORP.—TONS

Month	1933 Shipments	1933 Per Cent of Capacity	1934 Shipments	1934 Per Cent of Capacity	1935 Shipments	1935 Per Cent of Capacity	1936 Shipments	1936 Per Cent of Capacity	1937 Shipments	1937 Per Cent of Capacity
January	285,137	17.7	331,777	19.8	534,055	31.9	721,414	44.8	1,149,918	*75.4
February	275,929	18.5	385,500	25.9	583,137	39.2	676,315	45.3	1,133,724	82.5
March	256,793	15.3	588,209	35.2	668,056	41.5	783,552	50.5	1,414,399	92.7
April	335,321	21.6	643,009	41.5	591,728	36.7	979,907	63.2	1,343,644	91.0
May	455,302	27.1	745,063	44.5	598,915	35.8	984,097	63.4	1,304,039	85.5
June	603,937	37.4	985,337	61.2	578,108	36.7	886,065	57.1	1,268,550	85.8
July	701,322	45.1	369,938	23.9	547,794	34.0	950,851	61.3	1,186,752	77.9
August	668,155	39.8	378,023	22.6	624,497	37.3	923,703	59.6	1,107,858	72.6
September	575,161	35.6	370,306	23.9	614,933	39.7	961,803	62.0	1,047,962	71.1
October	572,897	35.5	343,962	20.6	686,741	41.1	1,007,417	62.6	792,310	52.0
November	430,358	26.7	366,119	22.7	681,820	42.3	882,643	59.2	587,241	39.7
December	600,639	38.7	418,630	27.0	661,515	42.7	1,067,365	68.8	.....	...
Plus or minus yearly adjustment	(+44,283)	...	(—19,907)	...	(—23,750)	...	(—40,859)	...	...	..
Total for year	5,805,235	30.1	5,905,966	30.6	7,347,549	38.1	10,784,273	58.2	.....	...

* Annual capacity 17,929,400 gross tons, with monthly percentages based on actual number of weeks in each month.

U. S. Steel Shipments Drop in November

NOVEMBER shipments of steel by United States Steel Corp. totaled 587,241 tons against 792,310 tons last October and 882,643 tons in November, 1936, while shipments for the first 11 months of this year were 12,336,397 tons or 26 per cent above the total of 9,797,767 tons for the like period of 1936.

Decrease in the corporations November shipments was 50,583 tons less than the decline shown in October shipments as compared with September.

Low Bid on Grand Coulee Dam is $34,442,240

SAN FRANCISCO, Dec. *13.—The Interior Construction Co., San Francisco, was the low bidder for the completion of the Grand Coulee Dam. Its bid was $34,442,240. The company consists of several construction concerns that have banded together to undertake this work, including Morrison-Knudsen Co., Boise, Idaho, J. F. Shea & Co., Portland, Ore.; MacDonald & Kahn, Ltd., San Francisco; General Construction Co., Seattle, Wash.; Utah Construction Co., San Francisco; Henry J. Kaiser Co., Inc., Oakland, Cal. The only other bidder was the Pacific Constructors, Inc., Spokane, Wash., whose bid was $42,185,802.

Tin Plate Cartel Decides to Maintain Official Price

LONDON *(Special Correspondence)*—It is announced from Essen, Germany, that a conference of the International Tin Plate Cartel took place recently, at which it was decided to maintain official quotations. Consumers' expectations of a slight reduction of prices have, therefore, not been fulfilled.

NLRB Trial Examiner Bloom and the CIO

By JOHN H. VAN DEVENTER

DOES the NLRB and its examiners have a paternal interest in CIO, as charged by William Green of the AFL and others? Would its agents go to unusual lengths to see that "trial" procedure is upset or modified at the request of CIO in order to give that organization an advantage?

It appears from last week's happenings in connection with the Labor Board's hearing of Bethlehem Steel that at least one Board examiner leans far enough in the CIO direction to even overrule the expressed intent of the Board itself and that twice in succession.

Under the title "Tail Wags Dog in Bethlehem Labor Board Hearing," we told how Examiner Frank Bloom, on Nov. 8, at Allentown, Pa., after seven weeks of taking testimony and at the written request of Anthony Wayne Smith, assistant counsel for CIO, had arbitrarily split the case into two cases. This in spite of a distinct order, issued by the Board itself on Aug. 26, consolidating them for hearing.

The consolidated case consisted of a complaint against Bethlehem by CIO charging that its employees' representation union was company dominated and an action by the Board to determine whether an election should be held. In a case of this sort it is necessary to hold hearings and take testimony at many different places because of the diversity of locations of plants and operations of the company.

The CIO strategy in making its request to split the case is quite understandable although unprecedented. If the case concerning company domination could be heard and acted upon favorably to CIO, none of the members of the employee representation plan could then be voted for if an election was ordered, nor would the plan appear on the ballot. This would enable a mere handful of CIO people to make a clean sweep. Another point which may have appealed to CIO is that the expense to the company would be doubled because of the necessity of going around the circuit twice.

As stated above, Examiner Bloom promptly acceded to the request of CIO in this matter, ordered the case split into two parts, refused the company's attorney a postponement to appeal to the Labor Board and refused a recess to permit him to reorganize his plans for defense along the new lines.

Examiner Bloom's ruling overruling the Labor Board was in turn overruled by that body a few weeks later. The Board said that its original order consolidating the cases would stand.

Apparently they reckoned without full knowledge of the persistency of Examiner Bloom, for on Friday last he performed the judicial miracle of splitting the case into two parts while still leaving its title undivided. In other words, he ordered the evidence in the first part to be taken around the circuit and completed before doing the same thing for the second part. Which is exactly what

the CIO counsel requested in the first place.

How many more actions of this sort will Congress tolerate before it decides to investigate the "labor policies" of the Labor Board?

Papers on Plastics Featured at A.S.M.E. Meeting in New York

HALF of the papers sponsored by the machine shop practice division during the annual meeting of the American Society of Mechanical Engineers, held in New York, Dec. 6-10, were devoted to the field of plastics, indicating the relative importance of these newer non-metallic substances are assuming in a field heretofore concerned almost entirely with metal-working problems.

Another significant trend was noted in the management division papers, which covered many of the new problems arising out of the rapid advance in the shops of unionism under Government sponsorship. Several of these meetings were jointly sponsored by the Society for the Advancement of Management, which also held its annual meeting in the city.

On Honors Night, Dec. 7, E. P. Bullard, president of the Bullard Co., Bridgeport, Conn., was awarded the A.S.M.E. Medal for "outstanding leadership in the development of station-type machine tools," referring specifically to the well known Mult-Au-Matics, the earliest form of which was first placed in operation at the Ford Motor Co. in 1914 and widely distributed since 1921. At a luncheon tendered Mr. Bullard preceding

E. P. BULLARD, president of the Bullard Co., Bridgeport, Conn., received the American Society of Mechanical Engineers Medal during the annual meeting of the society last week in New York for "outstanding leadership in the development of station-type machine tools." A luncheon meeting given in his honor by the Machine Shop Practice Division of the society preceded the actual award

this event, he advocated the use of a methods engineer not tied up with routine responsibilities and who is free to travel as he pleases with the object of discovering and putting into practice new methods. Through the use of such a roving engineer at the Bullard plant, the flame hardening of large size gear teeth has been introduced there in the past year, one of the most promising development of recent times, Mr. Bullard believes.

In a paper on design problems of molded plastic parts, D. M. Buchanan of the Bakelite Corp, New York, advocated that after the engineer and stylist or artist have agreed on a design, a perspective drawing be made, corrections made, and then a full scale model constructed of easily workable material such as wood or clay. Models should be carefully studied by the designers and production men for suggestions affecting economy of manufacture. A single-cavity experimental mold should then be made to enable such important characteristics as shrinkage, assembly and serviceability to be determined accurately before production tools are made. This seemingly complicated procedure is the surest way of making a plastic product that is 100 per cent satisfactory.

Mr. Buchanan warned against making walls too thin. He recommended a minimum thickness of 3/16 in. for small panel sections and ¼ to ⅜ in. on large surfaces such as found on office equipment. Good practice allows a 3-deg. draft to facilitate ejection from the mold. Practical tolerances on dimensions perpendicular to the line of molding pressure are ± 0.005 in. and parallel to the line of pressure, tolerances of ± 0.008 to ± 0.010 in. are more workable. The paper also discussed the subjects of inserts, threads, fastenings and hinges and fillets at some length, besides lettering and engraving and the important question of finish.

Demand Today for Good Appearance

Robert J. Hill, of the Gorham Co., Providence, R. I., in speaking on art in plastics design, warned against the manufacturing executive who boasts that he knows what he likes and persists in forcing the designer to execute his doubtful tastes. This same man may never think of dictating his engineer's invention. A designer should be employed that is sensitive to things that have general appeal. This often involves a careful study of the public's capacity for artistic understanding and acceptance. Today, there is a demand for pleasing appearance.

In describing the fundamental physics and chemistry of plastic materials, Harry Burrel, of the Ellis-Foster Co., Montclair, N. J., drew some rather homely analogies. A permanently plastic material he likened to a container of rice grains through which one could readily thrust his fist, whereas he would make no progress at all in a barrel of apples, illustrating that as molecular size increases, ability to flow under pressure decreases. If the barrel of apples is shaken violently, however, the agitation tends to eliminate the friction between the apples and the fist could eventually be pushed through. This analogy resembles a plastic that becomes soft on heating (the heat being analagous to tossing the molecular apples), but regains its solidity on cooling, in other words a thermoplastic substance.

In producing a synthetic resin,

the chemist's main aim is to increase the molecular weight and this he does by either polmerization or condensation. Polmerization is the so-called formation of a linear molecule in place of molecular unsaturation. This latter may be pictured as each individual molecule sitting with its arms folded. At a given signal, furnished by heat or a catalyst, each molecule joins a neighbor on each side so that a long chain of units is built up, thus increasing the molecular weight manifold.

Condensation, Mr. Burrel illustrated, may be imagined as a sort of pairing operation in which the molecules are girl and boy monkeys who join hands only with a member of the opposite sex. In this way straight chains can be built up with the units of alternate kinds. Monkeys have prehensile tails so that an individual from one chain may hook tails with an individual of another chain. In other words, molecules of a large size can be formed that constitute an immobile system. By carefully controlling the reaction, the equivalent of chains only can be formed and the chains welded later. This is what is done in a thermosetting composition, such as bakelite, where a partially reacted resin is molded while still in the plastic state, and continued heat in the presence of a catalyst "cures" it into an infusible state.

The paper went on to discuss in detail the chemical constituents and applications of the numerous plastic materials of both the thermosetting, or temporarily fusible types, and the thermoplastic or permanently fusible types. Another paper by L. F. Rahm discussed development in molding equipment.

Welding of Aluminum

Aircraft fuel tanks that are to be spot welded must be designed for considerably more accessibility than is necessary for hand riveted construction, F. V. Hartman, of the Aluminum Co. of America, stated in a paper on the welding of aluminum tanks. This process of joining also calls for more simplicity in construction. Some tanks can be made almost entirely by spot and seam welding, but most tanks can be built more satisfactorily if torch welding is also employed to some extent. A desirable design from this point of view substitutes for the usual baffles, U-shaped stiffner sections which are spot welded to the skin sheet by the two flanges of the U. The single-pan type baffle is also well suited for spot welding construction in some instances.

Spot and seam welding can be used satisfactorily for joining together aluminum sheets from 0.015 to 0.125 in. in thickness. Best results are obtained when the sheets being joined do not differ in thickness more than one or two gage numbers. Experience indicates that spot welds should be three to four times the number of rivets needed for similar construction, but should not be less than 5/8 in. on centers for fuel tanks. Equipment should be used in which the time of the current, its magnitude, and pressure between the electrodes are carefully controlled. For seam welding, full electronic control is essential and is desirable though not always necessary for spot welding.

U. S. Steel Moves Control of Sales, Operating Departments to Pittsburgh

(CONTINUED FROM PAGE 57)

"The United States Steel Corp. of New Jersey will continue to maintain its offices (at 71 Broadway, New York) as heretofore. Under the proposed arrangement the respective subsidiaries will continue business in their own names as previously. The arrangement described will, it is believed, secure better coordination of the activities of the subsidiaries, greater facility and effectiveness in the conduct of current transactions, improved efficiency, and be productive of a more complete identity of interest."

Companies Under New Plan

The principal subsidiary companies to be directed under Mr. Fairless in the new management corporation are:

American Bridge Co., American Steel & Wire Co., Carnegie-Illinois Steel Corp., Columbia Steel Co., H. C. Frick Coke Co., Michigan Limestone & Chemical Co., National Tube Co., Oil Well Supply Co., Oliver Iron Mining Co., Pittsburgh Limestone Co., Pittsburgh Steamship Co., Scully Steel Products Co., Tennessee Coal, Iron & Railroad Co., U. S. Steel Products Co., and Union Supply Co.

Members of the management company's executive committee are Messrs. Fairless, Beye, Howell, Mathesius, McKaig, Moses, Zimmerman, J. L. Perry, C. F. Hood, E. R. Stettinius, Jr., E. M. Voorhees and B. F. Harris.

TRADE NOTES

The Falk Corp., Milwaukee, announces the appointment of the Transmission Engineering Co., 116 New Montgomery Street, San Francisco, as its representative in northern California. This office will be in charge of A. Pedersen.

American Saw Mill Machinery Co., Hackettstown, N. J., has moved its New York sales offices to 120 Wall Street, following several innovations in its products, including an economy saw mill. A new model edger and lumber trimmer for speeding production are ready for the market, the company announced.

High Speed Hammer Co., Inc., 313 Norton Street, Rochester, N. Y., has recently appointed William Halpern & Co., 53 Park Place, New York, as exclusive sales representative for its high speed precision drilling machine in Massachusetts, Rhode Island and Connecticut. This concern will cover three counties in Connecticut and metropolitan New York jointly with H. M. Starke, 33 Weston Street, Nutley, N. J.

General Abrasive Co., Inc., Niagara Falls, N. Y., manufacturer of electric furnace abrasives, has appointed the Lea Mfg. Co., Waterbury, Conn., as distributer of Lionite polishing grains for Connecticut and Massachusetts, and the Udylite Co., Detroit, as distributer for Detroit and vicinity.

Lincoln Electric Co., Cleveland, Ohio, has opened a welding sales-engineering office at Atlanta, Ga. This office, at 412 Title Building, will be under the management of Robert Daniels.

F. J. ELLIOTT, formerly identified with E. F. Houghton & Co., Philadelphia, has been appointed Cleveland district sales manager of the Rustless Iron & Steel Corp., Baltimore, Md. He will make his headquarters at the Society for Savings Building, Cleveland.

❖ ❖ ❖

RAYMOND F. HOLLAND, who has been associated with the Buffalo Bolt Co., North Tonawanda, N. Y., since 1917, has been appointed purchasing agent, succeeding the late Dennis F. Cullinan.

❖ ❖ ❖

EDMUND S. DAVENPORT, of the research laboratory of the United States Steel Corp., Kearny, N. J., will discuss "Modern Steels for Modern Uses" at a science forum of the New York Electrical Society on Dec. 17, at the Engineering Auditorium, New York.

❖ ❖ ❖

A. S. ZAYTOUN and H. J. SCHEID have been appointed district sales representatives of the Newport Rolling Mill Co., Newport, Ky., in the Philadelphia territory, with offices at 916 Harrison Building.

THOMAS J. BRAY, JR., who has been appointed assistant to vice-president and general manager of sales, Carnegie-Illinois Steel Corp. Announcement of his promotion was made in these columns last week.

GEORGE B. FLETCHER, with headquarters in the Investment Building, Pittsburgh, has been made sales engineer in the Pittsburgh territory for the Cambridge Wire Cloth Co., Cambridge, Md.

❖ ❖ ❖

JOSEPH E. JACOBSON, of Luria Brothers & Co., Inc., Pittsburgh, has been elected president of the Pittsburgh chapter of the Institute of Scrap Iron and Steel.

❖ ❖ ❖

ARTHUR N. GOFF, who has been specializing in the sale of power and heating equipment for several years, has been placed in charge of sales in Wisconsin for the Roots-Connersville Blower Corp., Connersville, Ind. F. W. BARTLING

and G. T. OBERKLEIN will cover the southwestern section of Ohio and north central Kentucky.

❖ ❖ ❖

A. C. HANSEN, superintendent of the Cambria mine of Republic Steel Corp. at Negaunee, Mich., has been appointed assistant general superintendent of the Witherbee Sherman Corp. mining operations near Port Henry, N. Y., which were recently taken over by Republic. Mr. Hansen was graduated from the Rose Polytechnic Institute, in 1914, when he entered the employ of Republic Iron & Steel Co. as a safety engineer. Except for two years of service in France as a lieutenant and captain in the American Expeditionary Forces, he has been with Republic continuously. He was named superintendent of the Cambria mine in March, 1920, continuing there in that capacity after the Republic merger in 1930.

❖ ❖ ❖

DR. E. H. LESLIE, consulting engineer and for eight years professor of chemical engineering at the University of Michigan, has joined the technical staff of the Blaw-Knox Co., Pittsburgh. In his new capacity, Doctor Leslie will supervise the design and fabrication of operating units for the chemical and oil refining industries.

❖ ❖ ❖

WILLIAM R. SPINDLER has been appointed manager of exports of the Jones & Laughlin Steel Corp., with headquarters in the district sales office of the corporation in New York. Mr. Spindler entered the employ of Jones & Laughlin in 1919 in the order department at Pittsburgh. A years later he joined the wire sales department, remaining there until Jan. 1, 1925, when he was assigned to the export department. Since 1928, Mr. Spindler has been a member of the tube sales department, much of this time during the past year having been devoted to the sale of tubular products for export.

G. H. RITCHIE

George H. Ritchie, new general superintendent of the transportation department of the Tennessee Coal, Iron & Railroad Co., whose appointment was announced in these columns last week.

❖ ❖ ❖

DR. FRANCIS C. FRARY, director of research of the aluminum research laboratories of the Aluminum Co. of America, has been designated as the recipient of the Pittsburgh Award for 1937 by the Pittsburgh section of the American Chemical Society. The formal presentation will be made at a meeting of the section on Feb. 24.

❖ ❖ ❖

GORDON M. JACKSON, formerly president of the Jackson Engineering Corp., Tulsa, Okla., has become affiliated with Struthers-Wells Co., Warren, Pa., as New York district manager of the heat exchanger division.

❖ ❖ ❖

ROGER D. PROSSER, for years secretary of the American Saw Mill Machinery Co., Hackettstown, N. J., has been elected president. WILLIAM E. GUILD, formerly general sales manager, has been elected vice-president and treasurer, and WALTER D. BRIGGS, previously assistant sales manager, has been made vice-president in charge of sales and is also secretary. MALLORY L. FLETCHER, who has been with the company since its organization more than 33 years ago and who was for years vice-

president and treasurer, has retired from active service, but remains in an advisory capacity.

❖ ❖ ❖

OTTO F. SEIDENBECKER has been appointed sales manager of the Wisconsin Steel Co., by George E. Rose, vice-president of the International Harvester Co. in charge of steel operations. Mr. Seidenbecker will be in charge of all sales operations of the steel subsidiary.

Mr. Seidenbecker began his service with the Harvester company Sept. 9, 1912, in the foreign sales accounting division in the general offices in Chicago. Up until the time of the entry of the United States into the World War, he had varied accounting and sales experience in the farm implement division of the company. In May, 1917, he enlisted as a private in the United States Army and was later commissioned a lieutenant. From the end of the War until April, 1923, he served in various accounting and sales positions. He was then appointed works auditor of the coal mine operations of the Wisconsin Steel Co. at Benham, Ky., and held that position until Aug. 1, 1924, when he was appointed assistant auditor of the Wisconsin Steel Works. On Jan. 1, 1927, he became auditor of all operations of the Wisconsin Steel Co. and leaves this position to become general sales manager.

O. F. SEIDENBECKER

Navy Awards Ship Contracts

WASHINGTON, Dec. 14.—Assitant Secretary of the Navy Edison announced that contracts totaling $20,680,550 have been awarded to the New York Shipbuilding Corp., Camden, N. J., for construction of a seaplane tender and a destroyer tender. Allocation also was made to the Puget Sound Navy Yard at Bremerton, Wash., and the Charleston, S. C., Navy Yard for construction of one destroyer each at an estimated total cost of $9,204,000. Mr. Edison said that the Camden bids were lower than estimates from Navy yards and bids from other private builders.

Machine Tool Body Hits Profits Levy

A SURVEY of the machine tool industry, just completed by the National Tool Builders Association, reveals that machine tool builders find the undistributed profits tax a "very severe" hardship.

Comprising 135 plants employing about 43,000 men, the Association found its members, as makers of capital goods, experience extreme peaks and valleys in demand which force them to use the earnings of good years to defray losses of bad ones. For example, the Association said, the machine tool industry paid out 43 per cent of surplus accumulations up to 1929 to carry operations through 1934.

William H. Roe Runs One Mill 34 Years

KNOWN to his fellow workmen at the Wisconsin Steel Works of the International Harvester Co. as "the man who wore out a steel mill," William H. Roe, 68 years old, Chicago, veteran roller at the plant, is shown at the controls of the 32-in reversing blooming mill formally opened last week.

Mr. Roe acquired this distinction among his associates because he pulled the throttle that started the first steel ingot on its way through the blooming mill built by the company in 1903 and now being displaced. In the intervening 34 years Mr. Roe literally wore out a steel mill single handed.

In recognition of this unique record in the steel industry, Mr. Roe was given the honor of rolling the last ingot in the old mill and the first ingot in the new mill.

With 34 years of service at the Wisconsin Steel Works, Mr. Roe has a perfect safety record, having never lost any time due to accident or sickness. The oldest employee in point of service in the blooming mill department, Mr. Roe has been for several years eligible for a Harvester company pension but prefers to remain at his job of rolling blooms. He was transferred to that work in 1905 and has been a roller continuously since.

Mr. Roe is fond of travel and has used vacation and furlough periods for extensive motor tours. He likes his work, he stated at a luncheon following an inspection trip through the new mill, and regrets nearing the time when his working days may cease.

NLRB Calls Vote At New Britain Plant

WASHINGTON, Dec. 14.—Nearly 4000 employees of the American Hardware Corp.'s four plants at New Britain, Conn., will vote in an election called by the NLRB for late December to determine the exclusive collective bargaining union. Machinisis, tool and dye makers will vote for the United Electrical Workers, the CIO group, or the AFL's International Association of Machinists, or for neither group. Hourly workers will vote for or against the CIO union, according to the Labor Board.

The board has certified the United Electrical Radio Workers of America, Railway Equipment Workers Local No. 610, as exclusive bargaining agency of the production and maintenance employees at Westinghouse Airbrakes' Wilmerding, Pa., plant.

The board also announced certification of Cutlery Workers Local Union No. 20452 as the exclusive collective bargaining agency of the production employees at the Ontario Knife Co., Franklinville, N. Y.

Nine More Scrap-Hauling Ships Reported Chartered

LONDON (*Special Correspondence*).—Nine more vessels have just been reported in the London freight markets to have been chartered to load iron and steel scrap in the United States for Europe with loading dates extending into January. These vessels are in addition to 12 known to have been chartered Nov. 10 for the trade.

SWOC Plans Wage Policy for Contracts With Steel Makers

A STEEL wage policy to provide a basis for negotiations scheduled to be opened Feb. 7 with steel companies holding union wage contracts was to be set up this week in Pittsburgh at a Steel Workers Organizing Committee convention attended, according to the union, by 900 men.

Endorsement of a giant project by which the Government would finance building of 1,000,000 new homes, results of a union unemployment survey, and recommendations of steps to check the business decline were to be made known during the convention.

Before the union delegates for consideration were hundreds of resolutions. Whether specific action on demands for the checkoff of union dues and the closed shop in the steel industry would be taken was uncertain as the convention opened.

A report by Philip Murray, SWOC chairman, proposed that Congress make a thorough survey of curtailed job opportunities in specific industries, recommended the setting up of union employment committees to register furloughed or laid-off workers, urged establishing of geographical districts in negotiation of new union contracts, and suggested that the Government establish a housing authority to construct houses itself with loans of 100 per cent to workers unable to make down payments.

Mr. Murray urged the SWOC lodges work to secure Federal, state and local appropriations for more relief and public works and invited views on the union's wage policy but recommended that negotiations with the steel companies be left in the hands of executive officers and the scale committee.

During the convention the SWOC claimed it holds 445 contracts covering 550,000 men, and has won 48 of 66 Labor Board elections involving 60,000 workers in steel, steel fabricating and scrap iron and steel plants.

Indianapolis Machinery Completes New Building

INDIANAPOLIS MACHINERY AND SUPPLY CO., INC., 1959-1969 South Meridian Street, Indianapolis, a jobber of steel, mill, mine, factory, and electrical supplies, and machine tools, has recently enlarged its plant facilities through the addition of a new building.

Two departments have been added, one is a power transmission department, in charge of H. F. Gallagher. This department, as well as specializing in transmission equipment, will handle pumps, air compressors, unit heaters, and fans and blowers for air conditioning work.

The other new department is the electrical department, in charge of Charles Boling. This department will deal with the installation, repair and sale of electrical motors and generators, starting equipment, electric hoists, and related items.

Prices of Steel Found Lagging Behind Wages, Materials Cost

WAGES and the cost of major raw materials of the steel industry have increased substantially more since 1926 than the volume of steel produced, while steel prices have increased only half as much, according to the American Iron and Steel Institute.

In the first 11 months of this year, an average of 1,007,000 tons of steel ingots has been produced per week, 13 per cent more than the average of 893,700 tons per week produced in 1926, a year sometimes referred to as "normal."

Earnings of the wage-earning employees of the industry are estimated to have averaged $70,150,000 per month in the first 11 months of 1937, or 21 per cent above the average of $57,831,000 paid out monthly in wages during 1926.

A composite price of such important raw materials as iron ore, steel scrap, tin and zinc indicates that in the first 11 months of 1937 the prices which steel companies paid for these commodities was about 17 per cent higher than the 1926 level.

Iron ore and scrap prices this year have averaged respectively 16.5 per cent and 19 per cent above 1926, while the 1937 tin and zinc prices have averaged respectively 14 per cent and 9 per cent below 1926.

Last year the steel industry is estimated to have consumed over 12,000,000 tons of purchased scrap steel, over 45,000,000 tons of iron ore, approximately 36,000 tons of tin, and about 196,000 tons of zinc.

By comparison with the increase in wage and raw material costs, the composite price of finished steel so far this year, 2.55c. a lb., is only 6 per cent above the 1926 average of 2.41c. per lb.

$300,000 Award For Carnegie Tech

CARNEGIE INSTITUTE OF TECHNOLOGY, Pittsburgh, has received a gift of $300,000 from the Maurice and Laura Falk Foundation to establish a professorship of social relations in recognition of Mr. Falk's interest in social problems. The holder of this position will have charge of the new educational program at Carnegie Tech.

World Steel Output At New High Level

LONDON (*Special Correspondence*).—According to the annual report of the Steel works Association, Berlin, the total world production of raw steel in 1936 amounted to 124,000,000 tons. This constitutes a new high record, the previous record production being achieved in 1929, when the total output was 122,000,000 tons.

Before and After Redesign

THE illustrations, showing pictures of the Bell & Howell "Double Eight" motion picture camera before and after redesign, are of interest in showing how size appearance can be controlled through finishing treatment.

This camera was developed for those who want a small and compact instrument, and while this result was secured in the original design from the standpoint of actual dimensions, it did not give the appearance of small size.

A redesign was made, the curved line at the top being extended down the front to join the curved line at the bottom. Vertical finishing lines were confined to the area thus formed. The result was a smaller appearance of the finished camera though without dimensional change.

More important, from the manufacturing standpoint, is the fact that with a few comparatively inexpensive changes the original casting dies are used on the new model.

BEFORE

AFTER

Sloan Gives $10,000,000 For Economic Education

ALFRED P. SLOAN, JR., chairman of General Motors Corp. this week donated securities worth $10,000,000 as an endowment to the Alfred P. Sloan Foundation, an organization set up to encourage economic education. He described the foundation's objective as:

"The promotion of a wider knowledge of basic economic truths generally accepted as such by authorities of recognized standing and as demonstrated by experience, as well as a better understanding of economic problems in which we are today so greatly involved and as to which we are so importantly concerned."

Stop Name-Calling, Cooperate To Fight Slump, Girdler Asks

AN appeal for "universal cooperation to save industry and the country" was made this week at Chicago by Tom M. Girdler, chairman of Republic Steel Corp.

"This is no time for bitterness or name-calling or sulking," Mr. Girdler said in an address prepared for delivery at the annual banquet of the Illinois Manufacturers Association. "It is the time for a fearless and dispassionate search for the causes of our present plight so that we may know what steps are necessary to remedy or eradicate them."

Finds Business Tied

Warning that industry is being shackled by unwise laws the Republic official urged that revision of the Wagner Labor Relations Act include the following specific provisions:

1—Employees should have the free right to bargain collectively with their employers through representatives of their own choosing, without coercion from any source.

2—No employee should be forced to pay dues to a union.

3—All employees should be permitted to take a vote by secret ballot on whether or not they want to strike.

4—Responsibility of a union in any contract or agreement should be equal to the responsibility assumed by the employer.

Mr. Girdler, reminding his audience that what he had to say "was not in the spirit of carping criticism," was equally specific in outlining other steps which should be taken to stem the business recession. He said:

a—"We must make a real effort to balance the national budget and wipe out the threat of ruinous inflation. To move forward, business must, above all else, have confidence in the future.

b—"We need a drastic revision of our present methods of taxation. The undistributed profits tax is directly contributing to unemployment. The capital gains tax . . . places a heavy penalty on prosperity.

c—"The Social Security plan should be revised. As it stands today, it places an unduly heavy burden of taxation upon both employees and employers without guaranteeing the security which it is designed to provide.

d—"Let us have no more experiments in Government control. The very idea of more government encroachments upon the freedom of doing business is in itself enough to hamper and discourage enterprise.

Sees Basis For Recovery

"At present there are no basic economic causes for a prolonged recession," Mr. Girdler said. "On the contrary, there is right at hand the economic basis for a great period of industrial activity and prosperity which would give employment to millions of our people.

"There is widespread need for the building of new homes all over the country and for rehabilitation programs by the utilities and the railroads. Inventories of commodities are not generally excessive and interest rates are low. These are elements that should make for prosperity."

T. M. GIRDLER

Styling the claim that industry is deliberately encouraging the recession in an effort to embarrass the national Administration, as "twisted thinking," the Republic chairman said:

"Every enlightened business man of this country stands ready to put his shoulder to the wheel, to cooperate in every possible way in any practical effort to speed up industry and make more jobs. We are faced with a great emergency which calls for straight thinking and sane national action.

. . . Business quieter at year-end but works are well sold.

LONDON, Dec. 13, (*By Cable*).—New buying of iron and steel is quiet as the end of the year approaches, but works generally are still heavily sold and no pig iron or heavy steel is available before next year.

Increased supplies of basic pig iron from Canada and the United States enabled Cleveland producers to divert one basic furnace to foundry iron. Pig iron for export is very short, but 1500 tons was shipped to Australia.

The tin plate market is quiet, but revival of demand is possible since the reduction of the tin quota to 70 per cent may stiffen tin costs. Unfilled orders, excluding the recent large Canadian contract, amounted to 3,500,000 base boxes.

The price of black sheets is unchanged for 1938. The price of galvanized sheets was reduced 15 to 25s. according to the markets.

The Continental iron and steel market is still quiet, but inquiries are improving. Cartel prices generally have been left unchanged, but some rearrangements in accordance with the American agreement have been made.

A federation of British iron and steel merchants has been formed with a nucleus of six merchant associations. Other associations are expected to join. The chairman is C. Bruce Gardner. The main object of the new association is to maintain contact with the British Iron and Steel Federation.

OBITUARY

(CONTINUED FROM PAGE 75)

was identified with the Ford Motor Co. from 1922 to 1927 and for the next three years with the American Radiator & Standard Sanitary Mfg. Co. He had been identified with the American Brake Shoe company since 1935.

W. E. TAYLOR

WILLIAM E. TAYLOR, vice-president and director of the American Can Co., died suddenly in Chicago on Dec. 9, aged 59 years. He became identified with the company in 1901 as a mechanic at the Baltimore factory. He was later made foreman of the company's Philadelphia factory. Through a series of promotions he held various positions in the operating department, including superintendent of the Eastport, Me., factory, assistant manager of the equipment division and later manager of that division. From this post he rose in 1923 to general manager of manufacture and in 1932 became vice-president in charge of manufacture, the post he held at the time of his death.

❖ ❖ ❖

J. JUDSON DEAN, founder of the Cape Ann Tool Co., died at his home in Watertown, Mass., Dec. 6, aged 70 years. After a short business career as a young man in Florida, he established a drop forging business in Pigeon Cove, Mass., in 1891, and in 1909 one at Muncie, Ind., which was sold in 1909. Mr. Dean retired in 1920, the Massachusetts plant being taken over by his two sons, Lindley I. Dean and William J. Dean.

❖ ❖ ❖

FLOYD E. BADGER, sales manager of the Detroit Steel Products Co., died Dec. 9 in the Henry Ford Hospital, Detroit. Mr. Badger had been factory manager of Standard Parts Co., Cleveland, and a vice-president of the Armstrong Spring Co., Flint, Mich., before he went to Detroit 17 years ago. During the World War he was a captain and at the time of his death was an active member of the American Legion. He was 47 years old.

❖ ❖ ❖

HUGH J. REILLY died Dec. 11 in Los Angeles after a long illness. He formerly was superintendent of the Hunt Show Case Co., of Detroit. He was 63 years old and a native Detroiter.

❖ ❖ ❖

JOSEPH B. GROCE, public relations director of the Fore River works of the Bethlehem Shipbuilding Corp., died at his home in Quincy, Mass., on Dec. 10. Mr. Groce was born in Hingham, Mass., July 11, 1870, and was graduated from Tufts College. For several years he was a newspaperman and publisher, before becoming associated with the Fore River works, where he stayed until the end of the War. Later, for 13 years he was head of the Edison Electric Illuminating Co. public relations bureau, and then returned to the Fore River works.

Pittsburgh Scrap Men Elect Officers

JOSEPH E. JACOBSON, of Luria Brothers & Co., Inc., Pittsburgh, was elected president of the Pittsburgh chapter of the Institute of Scrap Iron and Steel at the annual meeting of the chapter at Pittsburgh last week.

Other officers elected include: vice-president, Meyer W. Singer, of M. W. Singer & Co., Pittsburgh; secretary, H. F. Stocker, of H. F. Stocker & Co., Pittsburgh; treasurer, David L. Wilkoff, of David L. Wilkoff Co., Pittsburgh.

The executive committee, in addition to the officers, will consist of the following: chairman, Edward L. Solomon, of Max Solomon Co., Pittsburgh; Abe Cohen, of Fort Pitt Tool & Supply Co., Pittsburgh; I. W. Solomon, of I. W. Solomon Co., Pittsburgh; Joseph Wilkoff, of the Wilkoff Co., Youngstown; Harry N. Cohn, of Butler Iron & Steel Co., Butler, Pa.; Louis Landay, of the M. N. Landay Co., Pittsburgh; H. N. Trimble, of H. N. Trimble Co., Pittsburgh.

Japan Contracts For Burmese Ore

TOKYO (*Special Correspondence*).—The Nakayama Steel Works has made a provisional contract with an Indian mine owner in Burma for importation of iron ore, the *Nikkan Kogyo* reports. The ore is said to contain 60 per cent iron. At first Britain tried to prevent the deal, according to the industrial organ, but it is noted that Burma has been independently administered since April 1.

Another move in the direction of decentralization of supply is reported in connection with the importation of nickel ore. The Taiyo Mining Co., which was recently established with a fully paid up capitalization of 300,000 yen, will increase the amount to 1,000,000 yen, as it has completed preparations for importation of nickel ore from French New Caledonia with the support of the Sumitomo Mining Co., the Japan Mining Co. and other metallurgical interests.

Japanese Cement Firms Plan To Make Steel

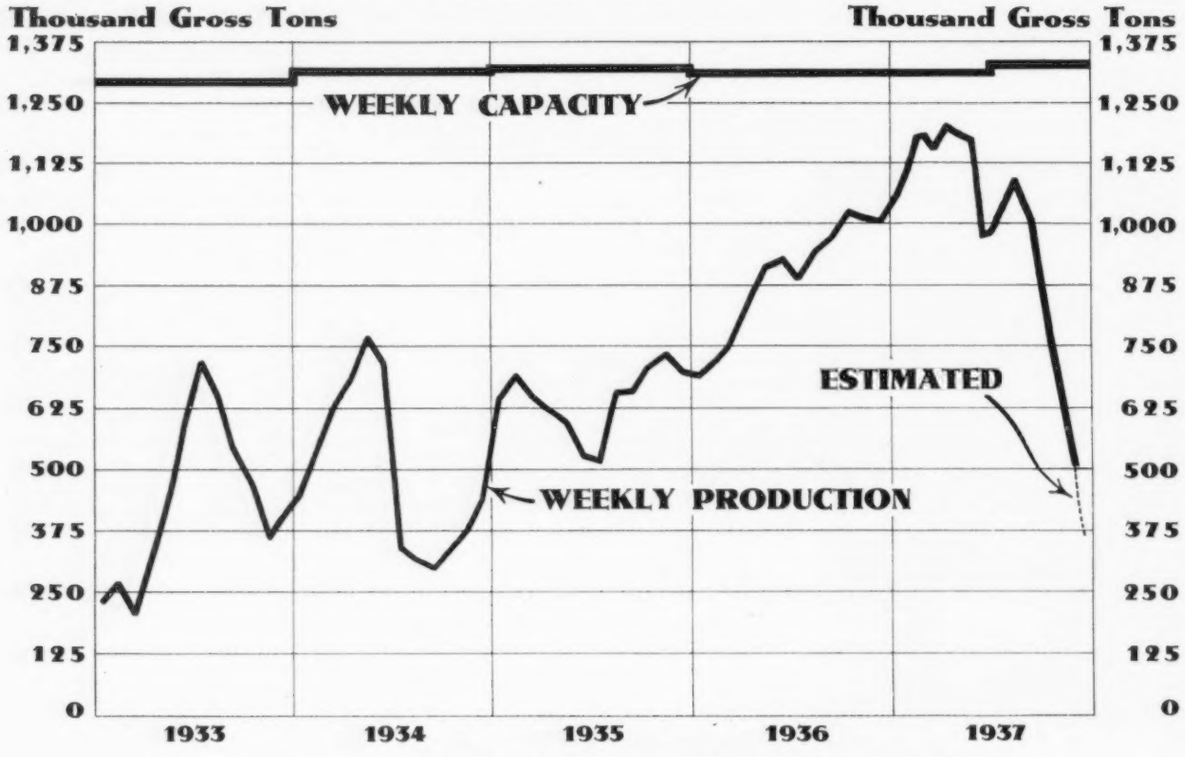
TOKIO (*Special Correspondence*) —Leading Japanese cement manufacturing concerns have decided to utilize their surplus productive capacity in metallurgical production. The companies have been forced to reduce cement production by 60 per cent.

The Asano Cement Co., with a paid-up capital of 63 million yen, the leading unit in the field, has decided to shift its newly released surplus electrical power, amounting to about 1,000,000 kw. hrs., to manufacture of electrolytic steels. Monthly production of 500 tons of steel ingot is planned.

The Japan Cement Co. (paid-up capital 7,250,000 yen) has decided to instal steel manufacturing facilities at its Yashiro plant for the monthly production of 300 tons of steel ingots.

PRODUCTION

Average Weekly Production of Open-Hearth and Bessemer Steel Ingots by Months, 1933-1937, and Estimated Production by Weeks in 1937



Figures for the Current Week Are Not Indicated on the Chart Until the Following Week

STEEL INGOT PRODUCTION BY DISTRICTS: Per Cent of Capacity

	Current Week	Last Week
Pittsburgh	24.0	24.0
Chicago	24.0	24.0
Valleys	27.0	29.0
Philadelphia	30.0	30.0
Cleveland	33.0	31.0
Buffalo	21.5	21.5
Wheeling	44.0	44.0
Southern	37.5	37.5
Ohio River	22.0	6.0
Western	55.0	55.0
St. Louis	13.0	29.0
Detroit	46.0	46.0
Eastern	40.0	40.0
Aggregate	27.5	27.5

Weekly Booking of Construction Steel

	Week Ended				Year to Date	
	Dec. 14, 1937	Dec. 7, 1937	Nov. 16, 1937	Dec. 15, 1936	1937	1936
Fabricated structural steel awards	24,050	16,750	18,800	29,920	1,028,135	1,018,125
Fabricated plate awards	2,765	450	0	3,115	114,280	212,840
Steel sheet piling awards	100	250	0	0	64,165	53,970
Reinforcing bar awards	2,550	6,215	3,950	4,775	288,640	322,570
Total Lettings of Construction Steel	29,465	23,665	22,750	37,810	1,495,220	1,607,505

. . . .SUMMARY OF THE WEEK. . . .

▼ ▼ ▼

. . . Decline in steel ingot output halted at 27½%.

° ° °

. . . Steel scrap 50c. a ton higher at Pittsburgh and Chicago.

° ° °

. . . Oil company inquires for 24,000 tons of pipe for export.

FOR the first time in more than three months, there has come a halt in the decline of steel-making operations, this week's estimated rate of 27½ per cent being the same as that of last week. Such important districts as Pittsburgh, Chicago, eastern Pennsylvania, Buffalo, Wheeling-Weirton, Birmingham and Detroit are holding at their previous rates, the Cleveland-Lorain district has gained two points, while the southern Ohio area, which was below 10 per cent, is up to 22 per cent. The only loss of consequence is at Youngstown, where the average is two points lower than a week ago.

It seems likely that approximately the present operations will be maintained up to the Christmas holidays, at which time some steel-making capacity probably will be shut down until after Jan. 1. During the final week of the year, however, business may be accumulated that will start operations off in January at moderately above the present level.

Stocks of steel in the hands of some consumers are now believed to be below normal. This is indicated by the great number of small orders being received, emphasizing the care that steel users are exercising in holding inventories to an absolute minimum until year-end stock taking is out of the way. Replenishment buying on a more general scale is probable in January, though the steel industry holds no expectations of an early rise in operations of more than very moderate proportions.

Although the decline in prices of steel scrap was halted in the third week of November, it was not until this week that prices actually advanced at Pittsburgh and Chicago, where there have been rises of 50c. a ton, with no change at Philadelphia, where a similar advance occurred a week ago. THE IRON AGE composite scrap price has risen for the second week, now being $13.42, or 50c. above its recent low. There have been some small mill purchases, but part of the strength in the market is accounted for by speculative buying by dealers. Severe weather, such as has recently been experienced in the Great Lakes area, tends to restrict the gathering and shipping of scrap, thereby adding firmness to the market.

THE fact that the Interstate Commerce Commission, apparently in response to President Roosevelt's urging, has further expedited hearings on the railroads' plea for higher freight rates, indicating that a decision may be reached in late February or early March, has given rise to hopes in the trade that railroad buying, assuming a favorable decision, will be an important factor by the second quarter of the new year.

Conditions in the automobile industry are immediately discouraging, but even so, an output of about 4,000,000 cars in 1938 is hopefully predicted by automobile statisticians against almost 5,000,000 in 1937. The motor car industry's forecasts of its own performance have usually been realized, and, if they do not miscarry in 1938, a considerably higher rate of automobile production might logically be expected by February.

In view of the greatly reduced volume of steel buying in most lines, the lettings of fabricated structural steel stand out as one of the bright spots of the current market. The week's reported awards totaled 24,000 tons, of which 3050 tons is for power houses for the Commonwealth & Southern Power Co., possibly a significant development of the rapprochement between the public utilities and the Federal Government. An apartment building in New York takes 1300 tons, and a viaduct approach to the Lincoln Tunnel, New York, 1835 tons. New projects out for bids total 24,650 tons, including 6000 tons for grade crossing elimination at Lynbrook, N. Y., for the Pennsylvania Railroad, 5000 tons for bulkhead gate frames and track units for the Grand Coulee Dam, and 2800 tons for a bridge over the Potomac River at Hancock, Md. Reinforcing bar awards are light, but a good deal of tonnage will be closed before Dec. 20, when protection against outstanding bids will be withdrawn by distributers.

An oil company is inquiring for 24,000 tons of 12¾-in. line pipe for export.

THE policy of the Steel Workers' Organizing Committee in its negotiations to be begun Feb. 7 with steel companies that have signed labor contracts, is being formulated this week at a convention of the SWOC in Pittsburgh. It is doubted that new wage demands will be presented, but other concessions, such as the checkoff of union dues and the closed shop, probably will be discussed.

Prices of Steel Found Lagging Behind Wages, Materials Cost

WAGES and the cost of major raw materials of the steel industry have increased substantially more since 1926 than the volume of steel produced, while steel prices have increased only half as much, according to the American Iron and Steel Institute.

In the first 11 months of this year, an average of 1,007,000 tons of steel ingots has been produced per week, 13 per cent more than the average of 893,700 tons per week produced in 1926, a year sometimes referred to as "normal."

Earnings of the wage-earning employees of the industry are estimated to have averaged $70,150,000 per month in the first 11 months of 1937, or 21 per cent above the average of $57,831,000 paid out monthly in wages during 1926.

A composite price of such important raw materials as iron ore, steel scrap, tin and zinc indicates that in the first 11 months of 1937 the prices which steel companies paid for these commodities was about 17 per cent higher than the 1926 level.

Iron ore and scrap prices this year have averaged respectively 16.5 per cent and 19 per cent above 1926, while the 1937 tin and zinc prices have averaged respectively 14 per cent and 9 per cent below 1926.

Last year the steel industry is estimated to have consumed over 12,000,000 tons of purchased scrap steel, over 45,000,000 tons of iron ore, approximately 36,000 tons of tin, and about 196,000 tons of zinc.

By comparison with the increase in wage and raw material costs, the composite price of finished steel so far this year, 2.55c. a lb., is only 6 per cent above the 1926 average of 2.41c. per lb.

$300,000 Award For Carnegie Tech

CARNEGIE INSTITUTE OF TECHNOLOGY, Pittsburgh, has received a gift of $300,000 from the Maurice and Laura Falk Foundation to establish a professorship of social relations in recognition of Mr. Falk's interest in social problems. The holder of this position will have charge of the new educational program at Carnegie Tech.

World Steel Output At New High Level

LONDON (*Special Correspondence*).—According to the annual report of the Steel works Association, Berlin, the total world production of raw steel in 1936 amounted to 124,000,000 tons. This constitutes a new high record, the previous record production being achieved in 1929, when the total output was 122,000,000 tons.

Before and After Redesign

THE illustrations, showing pictures of the Bell & Howell "Double Eight" motion picture camera before and after redesign, are of interest in showing how size appearance can be controlled through finishing treatment.

This camera was developed for those who want a small and compact instrument, and while this result was secured in the original design from the standpoint of actual dimensions, it did not give the appearance of small size.

A redesign was made, the curved line at the top being extended down the front to join the curved line at the bottom. Vertical finishing lines were confined to the area thus formed. The result was a smaller appearance of the finished camera though without dimensional change.

More important, from the manufacturing standpoint, is the fact that with a few comparatively inexpensive changes the original casting dies are used on the new model.

BEFORE

AFTER

Sloan Gives $10,000,000 For Economic Education

ALFRED P. SLOAN, JR., chairman of General Motors Corp. this week donated securities worth $10,000,000 as an endowment to the Alfred P. Sloan Foundation, an organization set up to encourage economic education. He described the foundation's objective as:

"The promotion of a wider knowledge of basic economic truths generally accepted as such by authorities of recognized standing and as demonstrated by experience, as well as a better understanding of economic problems in which we are today so greatly involved and as to which we are so importantly concerned."

Stop Name-Calling, Cooperate To Fight Slump, Girdler Asks

AN appeal for "universal cooperation to save industry and the country" was made this week at Chicago by Tom M. Girdler, chairman of Republic Steel Corp.

"This is no time for bitterness or name-calling or sulking," Mr. Girdler said in an address prepared for delivery at the annual banquet of the Illinois Manufacturers Association. "It is the time for a fearless and dispassionate search for the causes of our present plight so that we may know what steps are necessary to remedy or eradicate them."

Finds Business Tied

Warning that industry is being shackled by unwise laws the Republic official urged that revision of the Wagner Labor Relations Act include the following specific provisions:

1—Employees should have the free right to bargain collectively with their employers through representatives of their own choosing, without coercion from any source.

2—No employee should be forced to pay dues to a union.

3—All employees should be permitted to take a vote by secret ballot on whether or not they want to strike.

4—Responsibility of a union in any contract or agreement should be equal to the responsibility assumed by the employer.

Mr. Girdler, reminding his audience that what he had to say "was not in the spirit of carping criticism," was equally specific in outlining other steps which should be taken to stem the business recession. He said:

a—"We must make a real effort to balance the national budget and wipe out the threat of ruinous inflation. To move forward, business must, above all else, have confidence in the future.

b—"We need a drastic revision of our present methods of taxation. The undistributed profits tax is directly contributing to unemployment. The capital gains tax . . . places a heavy penalty on prosperity.

c—"The Social Security plan should be revised. As it stands today, it places an unduly heavy burden of taxation upon both employees and employers without guaranteeing the security which it is designed to provide.

d—"Let us have no more experiments in Government control. The very idea of more government encroachments upon the freedom of doing business is in itself enough to hamper and discourage enterprise.

Sees Basis For Recovery

"At present there are no basic economic causes for a prolonged recession," Mr. Girdler said. "On the contrary, there is right at hand the economic basis for a great period of industrial activity and prosperity which would give employment to millions of our people.

"There is widespread need for the building of new homes all over the country and for rehabilitation programs by the utilities and the railroads. Inventories of commodities are not generally excessive and interest rates are low. These are elements that should make for prosperity."

T. M. GIRDLER

Styling the claim that industry is deliberately encouraging the recession in an effort to embarrass the national Administration, as "twisted thinking," the Republic chairman said:

"Every enlightened business man of this country stands ready to put his shoulder to the wheel, to cooperate in every possible way in any practical effort to speed up industry and make more jobs. We are faced with a great emergency which calls for straight thinking and sane national action.

. . . Business quieter at year-end but works are well sold.

LONDON, Dec. 13, (*By Cable*).—New buying of iron and steel is quiet as the end of the year approaches, but works generally are still heavily sold and no pig iron or heavy steel is available before next year.

Increased supplies of basic pig iron from Canada and the United States enabled Cleveland producers to divert one basic furnace to foundry iron. Pig iron for export is very short, but 1500 tons was shipped to Australia.

The tin plate market is quiet, but revival of demand is possible since the reduction of the tin quota to 70 per cent may stiffen tin costs. Unfilled orders, excluding the recent large Canadian contract, amounted to 3,500,000 base boxes.

The price of black sheets is unchanged for 1938. The price of galvanized sheets was reduced 15 to 25s. according to the markets.

The Continental iron and steel market is still quiet, but inquiries are improving. Cartel prices generally have been left unchanged, but some rearrangements in accordance with the American agreement have been made.

A federation of British iron and steel merchants has been formed with a nucleus of six merchant associations. Other associations are expected to join. The chairman is C. Bruce Gardner. The main object of the new association is to maintain contact with the British Iron and Steel Federation.

OBITUARY

(CONTINUED FROM PAGE 75)

was identified with the Ford Motor Co. from 1922 to 1927 and for the next three years with the American Radiator & Standard Sanitary Mfg. Co. He had been identified with the American Brake Shoe company since 1935.

W. E. TAYLOR

WILLIAM E. TAYLOR, vice-president and director of the American Can Co., died suddenly in Chicago on Dec. 9, aged 59 years. He became identified with the company in 1901 as a mechanic at the Baltimore factory. He was later made foreman of the company's Philadelphia factory. Through a series of promotions he held various positions in the operating department, including superintendent of the Eastport, Me., factory, assistant manager of the equipment division and later manager of that division. From this post he rose in 1923 to general manager of manufacture and in 1932 became vice-president in cha.ge of manufacture, the post he held at the time of his death.

❖ ❖ ❖

J. JUDSON DEAN, founder of the Cape Ann Tool Co., died at his home in Watertown, Mass., Dec. 6, aged 70 years. After a short business career as a young man in Florida, he established a drop forging business in Pigeon Cove, Mass., in 1891, and in 1909 one at Muncie, Ind., which was sold in 1909. Mr. Dean retired in 1920, the Massachusetts plant being taken over by his two sons, Lindley I. Dean and William J. Dean.

❖ ❖ ❖

FLOYD E. BADGER, sales manager of the Detroit Steel Products Co., died Dec. 9 in the Henry Ford Hospital, Detroit. Mr. Badger had been factory manager of Standard Parts Co., Cleveland, and a vice-president of the Armstrong Spring Co., Flint, Mich., before he went to Detroit 17 years ago. During the World War he was a captain and at the time of his death was an active member of the American Legion. He was 47 years old.

❖ ❖ ❖

HUGH J. REILLY died Dec. 11 in Los Angeles after a long illness. He formerly was superintendent of the Hunt Show Case Co., of Detroit. He was 63 years old and a native Detroiter.

❖ ❖ ❖

JOSEPH B. GROCE, public relations director of the Fore River works of the Bethlehem Shipbuilding Corp., died at his home in Quincy, Mass., on Dec. 10. Mr. Groce was born in Hingham, Mass., July 11, 1870, and was graduated from Tufts College. For several years he was a newspaperman and publisher, before becoming associated with the Fore River works, where he stayed until the end of the War. Later, for 13 years he was head of the Edison Electric Illuminating Co. public relations bureau, and then returned to the Fore River works.

Pittsburgh Scrap Men Elect Officers

JOSEPH E. JACOBSON, of Luria Brothers & Co., Inc., Pittsburgh, was elected president of the Pittsburgh chapter of the Institute of Scrap Iron and Steel at the annual meeting of the chapter at Pittsburgh last week.

Other officers elected include: vice-president, Meyer W. Singer, of M. W. Singer & Co., Pittsburgh; secretary, H. F. Stocker, of H. F. Stocker & Co., Pittsburgh; treasurer, David L. Wilkoff, of David L. Wilkoff Co., Pittsburgh.

The executive committee, in addition to the officers, will consist of the following: chairman, Edward L. Solomon, of Max Solomon Co., Pittsburgh; Abe Cohen, of Fort Pitt Tool & Supply Co., Pittsburgh; I. W. Solomon, of I. W. Solomon Co., Pittsburgh; Joseph Wilkoff, of the Wilkoff Co., Youngstown; Harry N. Cohn, of Butler Iron & Steel Co., Butler, Pa.; Louis Landay, of the M. N. Landay Co., Pittsburgh; H. N. Trimble, of H. N. Trimble Co., Pittsburgh.

Japan Contracts For Burmese Ore

TOKYO (*Special Correspondence*).—The Nakayama Steel Works has made a provisional contract with an Indian mine owner in Burma for importation of iron ore, the *Nikkan Kogyo* reports. The ore is said to contain 60 per cent iron. At first Britain tried to prevent the deal, according to the industrial organ, but it is noted that Burma has been independently administered since April 1.

Another move in the direction of decentralization of supply is reported in connection with the importation of nickel ore. The Taiyo Mining Co., which was recently established with a fully paid up capitalization of 300,000 yen, will increase the amount to 1,000,000 yen, as it has completed preparations for importation of nickel ore from French New Caledonia with the support of the Sumitomo Mining Co., the Japan Mining Co. and other metallurgical interests.

Japanese Cement Firms Plan To Make Steel

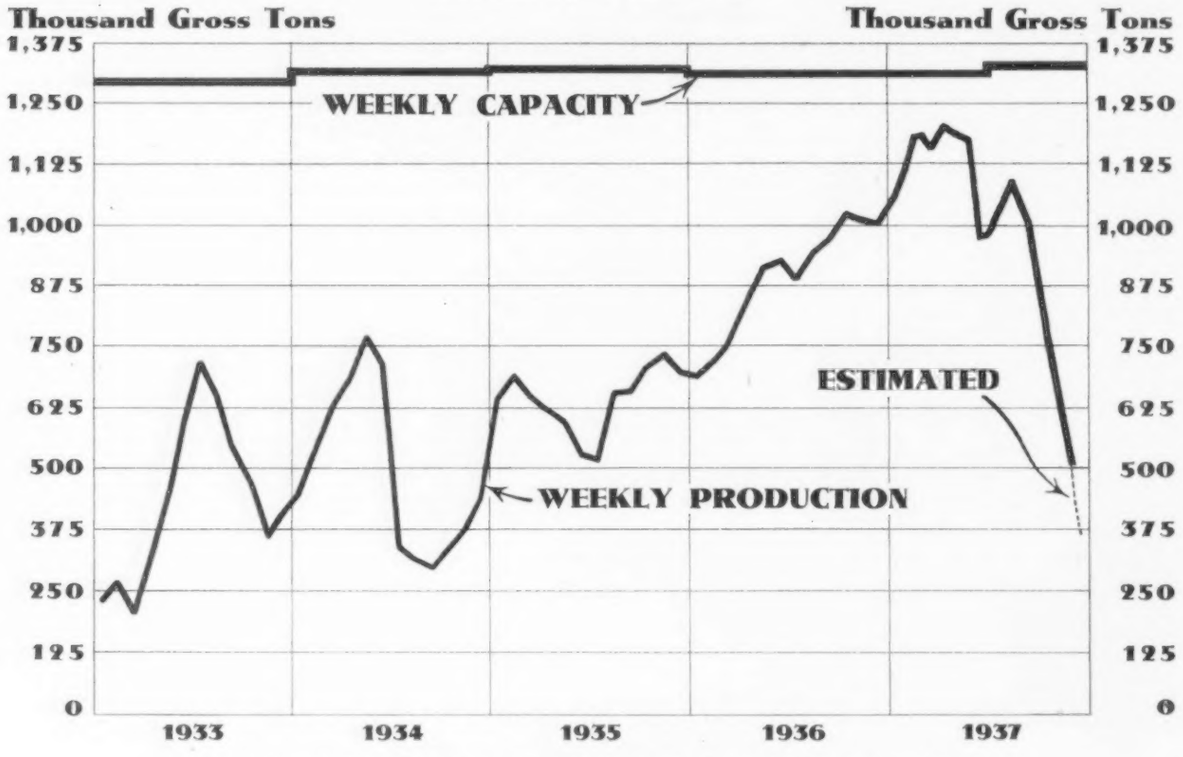
TOKIO (*Special Correspondence*) —Leading Japanese cement manufacturing concerns have decided to utilize their surplus productive capacity in metallurgical production. The companies have been forced to reduce cement production by 60 per cent.

The Asano Cement Co., with a paid-up capital of 63 million yen, the leading unit in the field, has decided to shift its newly released surplus electrical power, amounting to about 1,000,000 kw. hrs., to manufacture of electrolytic steels. Monthly production of 500 tons of steel ingot is planned.

The Japan Cement Co. (paid-up capital 7,250,000 yen) has decided to instal steel manufacturing facilities at its Yashiro plant for the monthly production of 300 tons of steel ingots.

PRODUCTION

Average Weekly Production of Open-Hearth and Bessemer Steel Ingots by Months, 1933-1937, and Estimated Production by Weeks in 1937



Figures for the Current Week Are Not Indicated on the Chart Until the Following Week

STEEL INGOT PRODUCTION BY DISTRICTS: Per Cent of Capacity

	Current Week	Last Week
Pittsburgh	24.0	24.0
Chicago	24.0	24.0
Valleys	27.0	29.0
Philadelphia	30.0	30.0
Cleveland	33.0	31.0
Buffalo	21.5	21.5
Wheeling	44.0	44.0
Southern	37.5	37.5
Ohio River	22.0	6.0
Western	55.0	55.0
St. Louis	13.0	29.0
Detroit	46.0	46.0
Eastern	40.0	40.0
Aggregate	27.5	27.5

Weekly Booking of Construction Steel

	Week Ended				Year to Date	
	Dec. 14, 1937	Dec. 7, 1937	Nov. 16, 1937	Dec. 15, 1936	1937	1936
Fabricated structural steel awards	24,050	16,750	18,800	29,920	1,028,135	1,018,125
Fabricated plate awards	2,765	450	0	3,115	114,280	212,840
Steel sheet piling awards	100	250	0	0	64,165	53,970
Reinforcing bar awards	2,550	6,215	3,950	4,775	288,640	322,570
Total Lettings of Construction Steel	29,465	23,665	22,750	37,810	1,495,220	1,607,505

. . . .SUMMARY OF THE WEEK. . . .

▼ ▼ ▼

. . . Decline in steel ingot output halted at 27½%.

o o o

. . . Steel scrap 50c. a ton higher at Pittsburgh and Chicago.

o o o

. . . Oil company inquires for 24,000 tons of pipe for export.

FOR the first time in more than three months, there has come a halt in the decline of steel-making operations, this week's estimated rate of 27½ per cent being the same as that of last week. Such important districts as Pittsburgh, Chicago, eastern Pennsylvania, Buffalo, Wheeling-Weirton, Birmingham and Detroit are holding at their previous rates, the Cleveland-Lorain district has gained two points, while the southern Ohio area, which was below 10 per cent, is up to 22 per cent. The only loss of consequence is at Youngstown, where the average is two points lower than a week ago.

It seems likely that approximately the present operations will be maintained up to the Christmas holidays, at which time some steel-making capacity probably will be shut down until after Jan. 1. During the final week of the year, however, business may be accumulated that will start operations off in January at moderately above the present level.

Stocks of steel in the hands of some consumers are now believed to be below normal. This is indicated by the great number of small orders being received, emphasizing the care that steel users are exercising in holding inventories to an absolute minimum until year-end stock taking is out of the way. Replenishment buying on a more general scale is probable in January, though the steel industry holds no expectations of an early rise in operations of more than very moderate proportions.

Although the decline in prices of steel scrap was halted in the third week of November, it was not until this week that prices actually advanced at Pittsburgh and Chicago, where there have been rises of 50c. a ton, with no change at Philadelphia, where a similar advance occurred a week ago. THE IRON AGE composite scrap price has risen for the second week, now being $13.42, or 50c. above its recent low. There have been some small mill purchases, but part of the strength in the market is accounted for by speculative buying by dealers. Severe weather, such as has recently been experienced in the Great Lakes area, tends to restrict the gathering and shipping of scrap, thereby adding firmness to the market.

THE fact that the Interstate Commerce Commission, apparently in response to President Roosevelt's urging, has further expedited hearings on the railroads' plea for higher freight rates, indicating that a decision may be reached in late February or early March, has given rise to hopes in the trade that railroad buying, assuming a favorable decision, will be an important factor by the second quarter of the new year.

Conditions in the automobile industry are immediately discouraging, but even so, an output of about 4,000,000 cars in 1938 is hopefully predicted by automobile statisticians against almost 5,000,000 in 1937. The motor car industry's forecasts of its own performance have usually been realized, and, if they do not miscarry in 1938, a considerably higher rate of automobile production might logically be expected by February.

In view of the greatly reduced volume of steel buying in most lines, the lettings of fabricated structural steel stand out as one of the bright spots of the current market. The week's reported awards totaled 24,000 tons, of which 3050 tons is for power houses for the Commonwealth & Southern Power Co., possibly a significant development of the rapprochement between the public utilities and the Federal Government. An apartment building in New York takes 1300 tons, and a viaduct approach to the Lincoln Tunnel, New York, 1835 tons. New projects out for bids total 24,650 tons, including 6000 tons for grade crossing elimination at Lynbrook, N. Y., for the Pennsylvania Railroad, 5000 tons for bulkhead gate frames and track units for the Grand Coulee Dam, and 2800 tons for a bridge over the Potomac River at Hancock, Md. Reinforcing bar awards are light, but a good deal of tonnage will be closed before Dec. 20, when protection against outstanding bids will be withdrawn by distributers.

An oil company is inquiring for 24,000 tons of 12¾-in. line pipe for export.

THE policy of the Steel Workers' Organizing Committee in its negotiations to be begun Feb. 7 with steel companies that have signed labor contracts, is being formulated this week at a convention of the SWOC in Pittsburgh. It is doubted that new wage demands will be presented, but other concessions, such as the checkoff of union dues and the closed shop, probably will be discussed.

. . . PITTSBURGH . . .

. . . Ingot production stationary; order volume shows little change.

o o o

. . . Some producers expect moderate improvement in January.

o o o

. . . 24,000 tons of line pipe for export being quoted on.

PITTSBURGH, Dec. 14.—Steel ingot output at individual plants in the Pittsburgh district continues irregular, but the rate for the district this week remains unchanged at 24 per cent of capacity. The Wheeling-Weirton output is also stationary at 44 per cent of capacity.

No perceptible improvement is looked for during the next few weeks owing to holiday influences. Total steel specifications during the past week have shown little, if any, change from the previous three weeks, although it is noted that customers are ordering sparingly in order to keep inventories at a minimum. This condition, however, is seasonal, and on the whole it appears that finished steel demand has been relatively stable in recent weeks.

Some producers expect an improvement in the volume of new business during January, but others are of the opinion that a real upward trend will not materialize that early. With mills able to give prompt delivery, many consumers may find it unnecessary to change their hand-to-mouth buying policies, although it is expected that the number of purchases and tonnages involved will show an increase.

An inquiry is out for approximately 24,000 tons of line pipe, about 220 miles, for export.

Demand for sheets and strip is dull and tin plate operations have slipped some this week to approximately 50 to 55 per cent. On the other hand, plate and shape inquiries and awards continue to be a stabilizing factor in an otherwise dull market.

No. 1 heavy melting steel is quotable this week at $13.50 a ton flat, reflecting a rise of 25c. a ton from last week's average quotation.

Pig Iron

New business is sporadic. Orders are small and represent only what is actually needed. Shipments are off somewhat from a month ago. Activity at sanitary ware and heating material plants is dull.

Semi-Finished Steel

Some specifications are being received for rods but activity in billets is exceptionally dull. Orders this week are not up to the previous period and most consumers are not inclined to order during the remainder of the year unless absolutely necessary.

Bars

Bar sales so far this month are running behind the corresponding period last month. The volume of business, however, is small so that actually little change in aggregate specifications is noted. Inventory and holiday influences are already being reflected in current bookings. Producers are pinning their hopes on a better outlook after the first of the year.

Cold Finished Bars

New business continues dull and sales show little change from a week ago. Some consumers have moved shipping dates back a few weeks.

Tubular Products

Texas Co., New York, has inquired for 24,000 tons of 12¾-in. line pipe, totaling about 220 miles, for export. Oil-country goods orders are about on a par with recent activity but orders are small and spotty. Standard pipe and boiler tube bookings are unimpressive.

Wire

Total specifications are below the volume of a few weeks ago. Further tapering off is expected in view of inventory and holiday influences. Merchant wire demand is at low ebb despite the fact that supplies in hands of jobbers are probably at the lowest point in a year. Because of this factor improved buying is expected after the first of the year.

Tin Plate

Current orders are small and irregular. Most activity is centered on advanced rolling of tin plate for 1938 consumption. Operations are estimated at about 50 to 55 per cent.

Sheets

Specifications have declined during the past week. Incoming business is composed of small fill-in orders. Automotive buying is lacking and miscellaneous demand is dull. The character of current business is affected somewhat by holiday and inventory influences.

Reinforcing Bars

Inquiries and awards during the past week have not been very impressive but this condition is more or less expected because of seasonal influences. Mill specifications have declined some and are not up to the average tonnages placed during the past several weeks. Prices are firmer.

Plates and Shapes

Plate and shape specifications have declined during the past week but the recession has not been marked. Orders so far this month are running below the corresponding November period but business is holding up better than anticipated.

Strip

Hot and cold rolled strip specifications are not any better than a week ago. Miscellaneous demand is sluggish and automotive buying is unimpressive. Considerable difficulty is encountered at

A Comparison of Prices

Market Prices at Date, and One Week, One Month, and One Year Previous
Advances Over Past Week in Heavy Type, Declines in Italics

Rails and Semi-finished Steel

Per Gross Ton:	Dec. 14, 1937	Dec. 7, 1937	Nov. 16, 1937	Dec. 15, 1936
Rails, heavy, at mill	$42.50	$42.50	$42.50	$39.00
Light rails, Pittsburgh	43.00	43.00	43.00	35.00
Rerolling billets, Pittsburgh	37.00	37.00	37.00	32.00
Sheet bars, Pittsburgh	37.00	37.00	37.00	32.00
Slabs, Pittsburgh	37.00	37.00	37.00	32.00
Forging billets, Pittsburgh	43.00	43.00	43.00	39.00
Wire rods, Nos. 4 and 5, P'gh	47.00	47.00	47.00	43.00
	Cents	Cents	Cents	Cents
Skelp, grvd. steel, P'gh, lb.	2.10	2.10	2.10	1.80

Finished Steel

Per Lb.:	Cents	Cents	Cents	Cents
Bars, Pittsburgh	2.45	2.45	2.45	2.05
Bars, Chicago	2.50	2.50	2.50	2.10
Bars, Cleveland	2.50	2.50	2.50	2.10
Bars, New York	2.79	2.79	2.79	2.40
Plates, Pittsburgh	2.25	2.25	2.25	1.90
Plates, Chicago	2.30	2.30	2.30	1.95
Plates, New York	2.54	2.54	2.54	2.19
Structural shapes, Pittsburgh	2.25	2.25	2.25	1.90
Structural shapes, Chicago	2.30	2.30	2.30	1.95
Structural shapes, New York	2.5125	2.5125	2.5125	2.16¼
Cold-finished bars, P'gh	2.90	2.90	2.90	2.35
Hot-rolled strips, Pittsburgh	2.40	2.40	2.40	2.15
Cold-rolled strips, Pittsburgh	3.20	3.20	3.20	2.85
Hot-rolled annealed sheets, No. 24, Pittsburgh	3.15	3.15	3.15	2.80
Hot-rolled annealed sheets, No. 24, Gary	3.25	3.25	3.25	2.90
Sheets, galv., No. 24, P'gh	3.80	3.80	3.80	3.40
Sheets, galv., No. 24, Gary	3.90	3.90	3.90	3.50
Hot-rolled sheets, No. 10, Pittsburgh	2.40	2.40	2.40	2.15
Hot-rolled sheets, No. 10, Gary	2.50	2.50	2.50	2.25
Cold-rolled sheets, No. 20, Pittsburgh	3.55	3.55	3.55	3.25
Cold-rolled sheets, No. 20, Gary	3.65	3.65	3.65	3.35
Wire nails, Pittsburgh	2.75	2.75	2.75	2.25
Wire nails, Chicago dist. mill	2.80	2.80	2.80	2.30
Plain wire, Pittsburgh	2.90	2.90	2.90	2.60
Plain wire, Chicago dist. mill	2.95	2.95	2.95	2.65
Barbed wire, galv., P'gh	3.40	3.40	3.40	2.70
Barbed wire, galv., Chicago dist. mill	3.45	3.45	3.45	2.75
Tin plate, 100 lb. box, P'gh.	$5.35	$5.35	$5.35	$5.25

On export business there are frequent variations from the above prices. Also in domestic business, there is at times a range of prices on various products, as shown in our detailed price tables.

Pig Iron

Per Gross Ton:	Dec. 14, 1937	Dec. 7, 1937	Nov. 16, 1937	Dec. 15, 1936
No. 2 fdy., Philadelphia	$25.76	$25.76	$25.76	$22.3132
No. 2, Valley furnace	24.00	24.00	24.00	20.50
No. 2, Southern Cin'ti	23.89	23.89	23.89	20.44
No. 2, Birmingham†	20.38	20.38	20.38	16.88
No. 2, foundry, Chicago*	24.00	24.00	24.00	20.50
Basic, del'd eastern Pa.	25.26	25.26	25.26	21.8132
Basic, Valley furnace	23.50	23.50	23.50	20.00
Malleable, Chicago*	24.00	24.00	24.00	20.50
Malleable, Valley	24.00	24.00	24.00	20.50
L. S. charcoal, Chicago	30.24	30.24	30.24	26.2528
Ferromanganese, seab'd carlots	102.50	102.50	102.50	80.00

† This quotation is subject to a deduction of 38c. a ton for phosphorus content of 0.70 per cent or higher.
* The switching charge for delivery to foundries in the Chicago district is 60c. per ton.

Scrap

Per Gross Ton:				
Heavy melting steel, P'gh.	**$13.75**	$13.25	$13.75	$19.60
Heavy melting steel, Phila.	14.25	14.25	12.75	15.75
Heavy melting steel, Ch'go	**12.25**	11.75	12.25	17.25
Carwheels, Chicago	**15.00**	14.50	14.50	18.00
Carwheels, Philadelphia	16.25	16.25	16.25	17.25
No. 1 cast, Pittsburgh	16.25	16.25	16.75	16.75
No. 1 cast, Philadelphia	**16.75**	16.25	16.25	17.25
No. 1 cast, Ch'go (net ton)	**12.00**	11.50	11.50	15.00
No. 1 RR. wrot., Phila.	16.25	16.25	16.25	15.75
No. 1 RR. wrot., Ch'go (net)	**10.25**	9.75	10.75	15.00

Coke, Connellsville

Per Net Ton at Oven:				
Furnace coke, prompt	$4.00	$4.00	$4.25	$4.00
Foundry coke, prompt	5.00	5.00	5.00	4.50

Metals

Per Lb. to Large Buyers:	Dec. 13 Cents	Cents	Cents	Cents
Electrolytic copper, Conn.	*10.25*	10.50	11.00	11.00
Lake copper, New York	11.125	11.125	12.125	11.12½
Tin (Straits), New York	*44.125*	44.50	43.00	52.50
Zinc, East St. Louis	5.00	5.00	5.75	5.25
Zinc, New York	5.35	5.35	6.10	5.62½
Lead, St. Louis	4.85	4.85	4.85	5.25
Lead, New York	5.00	5.00	5.00	5.50
Antimony (Asiatic), N. Y.	*14.25*	14.50	16.25	12.62½

The Iron Age Composite Prices

	Finished Steel	Pig Iron	Steel Scrap
Dec. 14, 1937	2.605c. a Lb.	$23.25 a Gross Ton	$13.42 a Gross Ton
One week ago	2.605c.	23.25	13.08
One month ago	2.605c.	23.25	12.92
One year ago	2.274c.	19.73	17.33
	Based on steel bars, beams, tank plates, wire, rails, black pipe, sheets and hot-rolled strip. These products represent 85 per cent of the United States output.	Based on average of basic iron at Valley furnace and foundry irons at Chicago, Philadelphia, Buffalo, Valley and Southern iron at Cincinnati.	Based on No. 1 heavy melting steel quotations at Pittsburgh, Philadelphia and Chicago.

	Finished Steel High	Finished Steel Low	Pig Iron High	Pig Iron Low	Steel Scrap High	Steel Scrap Low
1937	2.605c., Mar. 9	2.330c., Mar. 2	$23.25, Mar. 9	$20.25, Feb. 16	$21.92, Mar. 30	$12.92, Nov. 16
1936	2.330c., Dec. 28	2.084c., Mar. 10	19.73, Nov. 24	18.73, Aug. 11	17.75, Dec. 21	12.67, June 9
1935	2.130c., Oct. 1	2.124c., Jan. 8	18.84, Nov. 5	17.83, May 14	13.42, Dec. 10	10.33, April 23
1934	2.199c., Apr. 24	2.008c., Jan. 2	17.90, May 1	16.90, Jan. 27	13.00, Mar. 13	9.50, Sept. 25
1933	2.015c., Oct. 3	1.867c., Apr. 18	16.90, Dec. 5	13.56, Jan. 3	12.25, Aug. 8	6.75, Jan. 3
1932	1.977c., Oct. 4	1.926c., Feb. 2	14.81, Jan. 5	13.56, Dec. 6	8.50, Jan. 13	6.43, July 5
1931	2.037c., Jan. 13	1.945c., Dec. 29	15.90, Jan. 6	14.79, Dec. 15	11.33, Jan. 6	8.50, Dec. 29
1930	2.273c., Jan. 7	2.018c., Dec. 9	18.21, Jan. 7	15.90, Dec. 16	15.00, Feb. 18	11.25, Dec. 9
1929	2.317c., Apr. 2	2.273c., Oct. 29	18.71, May 14	18.21, Dec. 17	17.58, Jan. 29	14.08, Dec. 3
1928	2.286c., Dec. 11	2.217c., July 17	18.59, Nov. 27	17.04, July 24	16.50, Dec. 31	13.08, July 2
1927	2.402c., Jan. 4	2.212c., Nov. 1	19.71, Jan. 4	17.54, Nov. 1	15.25, Jan. 11	13.08, Nov. 22

some plants in attempting to set up economical rolling schedules.

Coal and Coke

Minimum coal prices set by the Coal Commission are to go into effect Dec. 16. However, several complaints by consumers have been registered and producers will be unable to determine their course of action until the day set by the commission for effectiveness of minimum prices. Meanwhile, industrial coal demand continues at low ebb and activity has been further reduced in the Connellsville coke region.

. . . *New business slow but output is maintained.*

TORONTO, Dec. 14.—Canadian iron and steel markets are slowing down insofar as new business is concerned and local steel representatives do not look for active trading until after the turn of the year. Many companies have started inventory taking and until this is completed there is a tendency to hold stocks to a minimum. No forward delivery contract booking is reported. It is stated, however, that prospects are favorable for first quarter contracts for some raw materials. Export demand for steel and its products also has slowed down, although many Canadian plants continue to work on old contracts.

Production in the Canadian steel industry shows comparatively little change from the peak levels of earlier in the year, but current operations are toward working off backlogs.

Pig iron sales have fallen sharply. It is stated that many melters are carrying sufficient supplies to carry them through to the end of the year with the result that new orders are from spot buyers and confined to small lots. The melt, however, continues in the neighborhood of 70 per cent, with lower rates for companies associated with the automotive industry. Production continues unchanged.

Iron and steel scrap sales are holding at a steady level, with demand specialized. Heavy melting steel has a ready call from the Hamilton mills, and there is some movement of turnings in this direction.

. . . *Buying continues to recede; operations lower.*

ST. LOUIS, Dec. 14.—Buying of pig iron is still confined to a carload here and there to fill an urgent need of some melter. There is almost no buying for first quarter delivery. There will be a heavy carryover, it is expected, of bookings under contracts. With the lessening of the tonnage being melted, the piles in yards of melters grow larger from the standpoint of the time they will last, and estimates made two months ago on the carryover of stocks in hands of consumers are being revised. Makers are said to be curtailing production rather than to carry stocks on piles.

Ingot operations in the St. Louis area dropped 10 points during the week to 13 per cent of capacity. The largest ingot operation in the district and two smaller ones are down, and probably will remain idle for the remainder of the year.

As the holidays approach, buying of finished steel continues to recede. There is very little pending, and it is not expected that there will be any considerable buying until after the inventories of consumers have been completed.

. . . *Production of ingots up a little but orders are slow.*

CINCINNATI, Dec. 14.—Fresh orders for sheets are all for small urgent needs and require less than 25 per cent mill operation. While consumers are reported to have reduced inventories, lack of business and a seasonal desire to keep stocks low combine to retard buying. First quarter interest is relatively nil, since consumers generally are not prone to anticipate needs.

Ingot steel production went upward the past week when one interest heated four open hearths. This schedule is to continue this week, bringing total open hearths in operation in the district to seven.

With most melters carrying fair inventories and the melt moving downward, new pig iron business is negligible. Shipments against contracts are not brisk. With the exception of machine tool foundries, the melt tends generally slower. Machine tool melters are holding to a rate of a little better than 50 per cent of capacity, with little change likely the remainder of this month.

. . . *Operations unchanged; semi-finished inventories low.*

BUFFALO, Dec. 11.—While demand for semi-finished steel is light and mill operating schedules are intermittent, inventories have been reduced to a minimum, signifying better rolling schedules in the event of an upturn in buying.

Operations remain as in the previous week, with Bethlehem's Lackawanna plant operating six open hearths and Republic Steel Corp., three. Wickwire Spencer Steel Corp.'s open hearths remain out of production. Bethlehem's strip mill was not operated last week.

Reinforcing bar makers report some demand for small lots, with many one-carload jobs listed.

A school at Dundee, N. Y., will require 100 tons of bars and 140 tons of structural steel. The Vestal, N. Y., school will require, in addition to the structural tonnage noted last week, about 150 tons of bars.

Steel warehouses report business light and prices the same, though some reduction may be made in the near future in the price of sheets.

The pig iron situation is quiet with operating schedules unchanged from last week.

. . . . CHICAGO . . . .

. . . Ingot output at 24%, unchanged from last week.

o o o

. . . Steel scrap has advanced for first time since summer.

o o o

. . . Consumers' inventories are fast being depleted.

CHICAGO, Dec. 13. — No change was reported this week in open-hearth operations, the district rate continuing at 24 per cent of capacity. Blast furnace activity likewise remained constant, 14 furnaces being in blast.

Although it is difficult to list anything tangible as a reason, a general strengthening of tone has been noticed here in the past week. Producers and consumers alike seem to be feeling better about conditions, probably because as the year draws to a close activity as a whole appears to be maintaining an unchanged level, which suggests that the bottom has been reached.

One thing certain is that inventories are fast being depleted. Definite proof of this statement is afforded by the fact that practically all of the small orders being received in sales offices require prompt delivery, which can only mean that material is not at hand and that in order to maintain manufacturing operations steel must be secured immediately.

Some plants are understood to have taken inventory earlier than usual this year because of their own inactivity, in which case new stock orders should be coming in some time this month. Generally, however, it is believed that little December buying will be seen because of consumers' desires to keep their inventories low until the new year.

Steady sales, but an increase in specifications, was reported by one leading seller, who also expressed the opinion that the trade in general was feeling considerably more optimistic than it was three or four weeks ago. Little more in the way of rail purchasing is looked for this year, but a leading roller here believes the dollar value of rail sales in 1938 will at least equal those of 1937 and that the railroad budgets prepared thus far for next year show little or no decrease in the rail allotments. That a considerable amount of business will be placed within a very short time in the event that the railroads are given a rate increase is the common belief in this district. The Burlington is expected to place some of the steel for its car program shortly. About 10,000 tons of rolled steel will be required for the 600 cars planned, although all of these may not be released at one time.

Farm implement tonnage is holding up well, with some increases in specifications being noticed from time to time. One mill reports as most active last week the forgers, farm equipment makers and jobbers. Orders from automobile makers and suppliers are registering no increase whatsoever from week to week.

For the first time since late summer, the price of heavy melting steel in this district advanced, $12 to $12.50 now being quoted, a rise of 50c. a ton. Higher brokers' bids, better realizations from railroad sales, and a release of shipments at one important local mill were factors in the increase.

Pig Iron

In the first 10 days of December shipments of foundry coke were off 15½ per cent, while pig iron shipments showed a decrease of nearly 50 per cent from the corresponding period last month. A firmer tone is being exhibited, however, in that spot sales are slightly better, one seller reporting small orders daily. These are being occasioned of course by the depletion of inventories and the necessity of obtaining just enough iron to carry over into 1938.

Shapes and Bars

Small schools throughout Illinois compose the bulk of the structural and reinforcing items this week, all being small. Klug & Smith Co., Milwaukee, is the low general contractor on the La Crosse, Wis., bridge, the largest pending project in this area, but no steel awards have yet been announced.

Sheets

A slight increase in sheet orders has been noticed. Deliveries continue at two to three weeks for cold rolled and hot rolled annealed. The rise cannot be attributed to any certain source, such as the automobile industry, according to one seller, all helping to swell the total.

Warehouse Business

Jobber activity here continues under the definite and seasonal influence of year-end paring down of inventories, this trend being expected to last until about Jan. 15. What may be a significant point has lately been noticed. Some manufacturers have recently been buying certain items from time to time, but in such small quantities that it seems fairly certain stocks are low and just enough material is being picked up to tide them over into 1938. It is generally believed that the surplus stocks of Labor Day are now well worked down.

T. C. I. Finds Shortage Of Skilled Workers

TENNESSEE COAL, IRON & RAILROAD CO., United States Steel Corp. subsidiary, has launched a program of apprentice training at its Birmingham plants to meet a shortage of skilled workers.

An apprentice advisory committee of engineers, superintendents, and master mechanics from the manufacturing, mining and transportation divisions developed training schedules which include practical experience in many operating departments and classroom instruction. A four-year course has been installed totaling 8000 hr., based on a 40-hr. week, 50 weeks a year.

FABRICATED STEEL

. . . Lettings in larger volume at 25,250 tons compared with 16,750 last week.

o o o

. . . New projects advance to 24,650 tons from 11,200 tons a week ago.

o o o

. . . Plate awards call for 2765 tons.

NORTH ATLANTIC STATES

Presque Isle, Me., 180 tons, approach spans, Bangor & Aroostook Railroad, to Bethlehem Steel Co., Bethlehem, Pa.

Bridgeport, Conn., 200 tons, garage for Southern New England Telephone Co., to American Bridge Co., Pittsburgh.

Greenwich, Conn., 230 tons, fire house and police station, to Bethlehem Steel Co.

New York, 1300 tons, apartment building, Wallenstein Construction Co., to Harris Structural Steel Co., Plainfield, N. J.

Livingston Manor, N. Y., 550 tons, school building, to Bethlehem Steel Co.

Chaumont, N. Y., 115 tons, grade and high school, to Syracuse Engineering Co., Syracuse, N. Y.

Vestal, N. Y., 605 tons, Central School, to Bethlehem Contracting Co., Bethlehem, Pa.

Monroe County, N. Y., 220 tons, State highway bridge, to Genesee Bridge Co., Rochester, N. Y.

Niagara Falls, N. Y., 100 tons, Woolworth store, to Bethlehem Contracting Co., Bethlehem, N. Y.

Weehawken, N. J., 1835 tons, viaduct, New Jersey approach to Lincoln Tunnel, to Taylor-Fitcher Construction Co., New York.

Monmouth County, N. J., 150 tons, Pennsylvania overpass, to American Bridge Co., Pittsburgh.

Freehold, N. J., 150 tons, State overpass bridge, to American Bridge Co.

Grove City, Pa., 225 tons, Crawford Hall, to Pittsburgh Bridge & Iron Co., Pittsburgh.

Davidsville, Pa., 140 tons, junior and senior high school, to Griffith-Custer Steel Co., Johnstown, Pa.

New Castle, Pa., 1500 tons, Commonwealth & Southern Corp. power house, to Ingalls Iron Works Co., Birmingham.

Philadelphia, 170 tons, addition to 108th Field Artillery armory, to Bethlehem Steel Co., Bethlehem, Pa.

Polk, Pa., 400 tons, girls' infirmary, piggery and tunnel for State of Pennsylvania, to Bethlehem Steel Co., Bethlehem, Pa.

THE SOUTH

Fayette County, Tex., 190 tons, bridge, to Mosher Steel Co., Dallas, Tex.

Dickens County, Tex., 295 tons, bridge, to North Texas Iron & Steel Co., Fort Worth, Tex.

Walker County, Tex., 445 tons, highway bridge, to Bethlehem Steel Co., Bethlehem, Pa.

CENTRAL STATES

Bay City, Mich., 1550 tons, Commonwealth & Southern power house, to Ingalls Iron Works, Birmingham.

Lockland, Ohio, 120 tons, International Agriculture Corp. building, to Ingalls Iron Works Co., Birmingham.

Ottawa, Ill., 200 tons, mix house, Libbey-Owens-Ford Glass Co., to Mississippi Valley Structural Steel Co., St. Louis.

Fargo, N. D., 200 tons, 13th Street State undercrossing, to Bethlehem Steel Co., Bethlehem, Pa.

Lead, S. D., 785 tons, sand cyanide building, Homestake Mining Co., to Worden-Allen Co., Milwaukee.

Evansville, Ind., 100 tons, armory, to G. L. Mesker & Co., Evansville, Ind.

Clay County, Ind., 160 tons, bridge, to Vincennes Bridge Co., Vincennes, Ind.

Vincennes, Ind., 100 tons, Montgomery Ward building, to Bethlehem Steel Co., Bethlehem, Pa.

Chippewa County, Minn., 160 tons, bridge, to Minneapolis-Moline Power Implement Co., Minneapolis.

North Wichita, Kan., 310 tons, steam-electric station, to Ben Sibbitt Iron & Foundry Co., Wichita, Kan.

Crowell, Neb., 178 tons, highway bridge, to Illinois Steel Bridge Co., Jacksonville, Ill.

WESTERN STATES

St. Regis, Mont., 430 tons, bridge, to Virginia Bridge Co., Roanoke, Va.

Flathead County, Mont., 365 tons, bridge, to Minneapolis-Moline Power Implement Co., Minneapolis.

Boulder Canyon Project, 144 tons, radial gates, to Pacific Iron & Steel Co., Ltd., Los Angeles.

Glendale, Cal., 240 tons, Southern California Telephone Co. building, to Virginia Bridge Co., Roanoke, Va.

NEW STRUCTURAL STEEL PROJECTS

NORTH ATLANTIC STATES

Hartford, Conn., 215 tons, apartment building.

Warwick, R. I., 300 tons, city airport.

North Providence, R. I., 120 tons, high school.

New York, 475 tons, public school No. 119 in Bronx; bids in.

Queens, N. Y., 225 tons, public school No. 134; bids in.

Queens, N. Y., 2560 tons, lift bridge and grade elimination for Bronx-Whitestone bridge; James Stewart & Co., low bidders.

Brooklyn, 1500 tons, Brooklyn Central Library.

Flushing, N. Y., 150 tons,. State highway bridge WF-37-7.

Orange County, N. Y., 150 tons, State highway bridge.

Bayville, N. Y., 500 tons, Nassau County bridge.

St. Albans, N. Y., 550 tons, St. Pascal Church convent and school.

Riverhead, N. Y., 380 tons, State grade separation bridge RC-2500-3929.

Lynbrook, N. Y., 6000 tons, grade crossing elimination, Long Island Railroad Co.

Dundee, N. Y., 140 tons; bids taken Dec. 10.

Madison, N. J., 170 tons, library building, Drew University.

Philadelphia, 130 tons, board plant and warehouse additions, U. S. Gypsum Co.

Harrisburg, Pa., 100 tons, hospital; bids Dec. 21.

Trenton, N. J., 500 tons, Montgomery Ward store; bids Dec. 21.

Pittsburgh, 500 tons, Coca-Cola Co. bottling plant.

Baltimore, 330 tons, S. S. Kresge Co. store building.

Hancock, Md., 2800 tons, Wichert continuous bridge over Potomac River.

THE SOUTH

Port Royal, S. C., 275 tons, bridge.

Baton Rouge, La., 800 tons, Louisiana Steam & Generating Corp.

Mobile, Ala., 500 tons, Aluminum Co. plant.

Gunthersville, Ala., 250 tons, overhead cranes.

CENTRAL STATES

Detroit, 585 tons, building for Divco Twin Truck Co.

Cleveland, 300 tons, Cuyahoga Heights school building; bids rejected, to be readvertised.

Niles Center, Ill., 182 tons, school; bids taken Dec. 13.

Peru, Ill., 150 tons, school.

Elgin, Ill., 200 tons, school; bids taken Dec. 15.

Waterloo, Iowa, 180 tons, Montgomery Ward building.

WESTERN STATES

Coconino County, Ariz., 255 tons, Wilson Canyon bridge; bids Dec. 28.

(CONTINUED ON PAGE 113)

. . . CLEVELAND . . .

. . . Ingot rate up at Cleveland, lower at Youngstown.

o o o

. . . Demand for finished steel shows a slight improvement.

o o o

. . . Stocks of some consumers are now believed to be below normal.

CLEVELAND, Dec. 13.—Ingot output in the Cleveland-Lorain district will show a two-point gain to 33 per cent of capacity this week due to the mid-week resumption of two open-hearth furnaces at the local plant of the Republic Steel Corp. In the Youngstown district production has declined two points to 27 per cent of capacity.

Demand for finished steel for the first time in several weeks shows a definite, although a slight, improvement. More incoming business is reported by nearly all producers. While orders are quite numerous, all are small, few being for more than car lots. Consumers are buying to fill in stocks, many of which are now below normal.

In many cases buyers wait until they are in need of steel and shop around, giving the order to the mill that can make the best delivery. With the holidays near at hand, there is little expectation that the increase in business will be maintained during the last half of the month. However, a sustained upturn is looked for early in January.

Agricultural implement manufacturers and miscellaneous consumers are ordering steel a little more freely. Demand from the motor car industry continues to drag, showing no improvement. Some of the automobile parts plants are doing little at present, having been operating at a higher production rate than warranted by the motor car output. These, having built up stock, have slowed down until they secure new releases.

Activity in the construction field is very light. A spurt in orders for reinforcing bars is resulting from the announcement of Dec. 20 as the deadline for closing for steel for identified projects, for which quotations are outstanding, presumably at prices lower than established quotations.

Railroads are expected to remain inactive until a decision is announced on their request for freight advances.

While the local scrap market does not show any firmer tone, price declines seem to have been checked.

Pig Iron

Pig iron sales and shipments continue slack, and from present indications considerable tonnage will be carried over on producers' books into the first quarter of 1938. The agricultural implement industry remains fairly active, but automotive and other consumers are in no hurry for iron at present. One additional merchant furnace in the Lake district is expected to be banked this week.

Iron Ore

Some ore mining companies in the Lake Superior district are slowing down operations of their underground mines because, with the large stocks accumulated by consumers this year, the amount of ore to be shipped during 1938 probably will be considerably less than during the present year. Stock piles at these mines were well cleaned up this year.

Bolts, Nuts and Rivets

Little business is coming from either consumers or jobbers. Backlogs have been about wiped out and production has been further curtailed. It is estimated that the industry is now operating at about 30 per cent of capacity. Orders from the motor car industry are small and other buyers are limiting their purchases to fill-in orders. Some buyers are holding back because they think that prices may decline. Rivet manufacturers are hopeful of an increased activity in the railroad equipment field which will stimulate the demand for their product, which at present is very light.

Bars, Plates and Shapes

Demand for merchant bars is a little more active than during the past few weeks. All orders are for small lots for filling in stocks. Business from the motor car industry continues very slack. Orders for structural shapes are slightly better, although there is almost a total absence of new building projects outside of a few requiring very small lots. Plates continue dull. Lake shipyards expect to have boat repair work early in the year that will require some plate tonnage. Reinforcing bar business has been stimulated considerably by the new price set-up under which contracts based on outstanding quotations covering identified projects must be closed by Dec. 20. Makers seem hopeful that shading below the published prices that has long prevailed will be eliminated.

Sheets and Strip

Despite the fact that inventories of many consumers are out of balance and below normal levels, replacement orders are still infrequent. Sellers are doubtful that any real improvement can be shown over the remainder of this month, but hope for an upturn in January. While automotive and miscellaneous specifications have been negligible recently, refrigerator manufacturers have managed to maintain a fair rate of activity. Hot and cold rolled strip steel producers report that many parts makers have reduced their operations owing to the fact that orders originally scheduled for December shipment have been delayed until after the first of next year. Inventories of some strip consumers are said to be insufficient for more than 10 days' or two weeks' operations. At the opening of bids recently by the State of Ohio for 300 tons of one-pass cold rolled sheets for 1939 license tags, it was found that a Youngstown jobber quoted 3.79c. while nine mills bid the regular price of 3.82c.

FABRICATED STEEL

. . . Lettings in larger volume at 25,250 tons compared with 16,750 last week.

o o o

. . . New projects advance to 24,650 tons from 11,200 tons a week ago.

o o o

. . . Plate awards call for 2765 tons.

NORTH ATLANTIC STATES

Presque Isle, Me., 180 tons, approach spans, Bangor & Aroostook Railroad, to Bethlehem Steel Co., Bethlehem, Pa.

Bridgeport, Conn., 200 tons, garage for Southern New England Telephone Co., to American Bridge Co., Pittsburgh.

Greenwich, Conn., 230 tons, fire house and police station, to Bethlehem Steel Co.

New York, 1300 tons, apartment building, Wallenstein Construction Co., to Harris Structural Steel Co., Plainfield, N. J.

Livingston Manor, N. Y., 550 tons, school building, to Bethlehem Steel Co.

Chaumont, N. Y., 115 tons, grade and high school, to Syracuse Engineering Co., Syracuse, N. Y.

Vestal, N. Y., 605 tons, Central School, to Bethlehem Contracting Co., Bethlehem, Pa.

Monroe County, N. Y., 220 tons, State highway bridge, to Genesee Bridge Co., Rochester, N. Y.

Niagara Falls, N. Y., 100 tons, Woolworth store, to Bethlehem Contracting Co., Bethlehem, N. Y.

Weehawken, N. J., 1835 tons, viaduct, New Jersey approach to Lincoln Tunnel, to Taylor-Fitcher Construction Co., New York.

Monmouth County, N. J., 150 tons, Pennsylvania overpass, to American Bridge Co., Pittsburgh.

Freehold, N. J., 150 tons, State overpass bridge, to American Bridge Co.

Grove City, Pa., 225 tons, Crawford Hall, to Pittsburgh Bridge & Iron Co., Pittsburgh.

Davidsville, Pa., 140 tons, junior and senior high school, to Griffith-Custer Steel Co., Johnstown, Pa.

New Castle, Pa., 1500 tons, Commonwealth & Southern Corp. power house, to Ingalls Iron Works Co., Birmingham.

Philadelphia, 170 tons, addition to 108th Field Artillery armory, to Bethlehem Steel Co., Bethlehem, Pa.

Polk, Pa., 400 tons, girls' infirmary, piggery and tunnel for State of Pennsylvania, to Bethlehem Steel Co., Bethlehem, Pa.

THE SOUTH

Fayette County, Tex., 190 tons, bridge, to Mosher Steel Co., Dallas, Tex.

Dickens County, Tex., 295 tons, bridge, to North Texas Iron & Steel Co., Fort Worth, Tex.

Walker County, Tex., 445 tons, highway bridge, to Bethlehem Steel Co., Bethlehem, Pa.

CENTRAL STATES

Bay City, Mich., 1550 tons, Commonwealth & Southern power house, to Ingalls Iron Works, Birmingham.

Lockland, Ohio, 120 tons, International Agriculture Corp. building, to Ingalls Iron Works Co., Birmingham.

Ottawa, Ill., 200 tons, mix house, Libbey-Owens-Ford Glass Co., to Mississippi Valley Structural Steel Co., St. Louis.

Fargo, N. D., 200 tons, 13th Street State undercrossing, to Bethlehem Steel Co., Bethlehem, Pa.

Lead, S. D., 785 tons, sand cyanide building, Homestake Mining Co., to Worden-Allen Co., Milwaukee.

Evansville, Ind., 100 tons, armory, to G. L. Mesker & Co., Evansville, Ind.

Clay County, Ind., 160 tons, bridge, to Vincennes Bridge Co., Vincennes, Ind.

Vincennes, Ind., 100 tons, Montgomery Ward building, to Bethlehem Steel Co., Bethlehem, Pa.

Chippewa County, Minn., 160 tons, bridge, to Minneapolis-Moline Power Implement Co., Minneapolis.

North Wichita, Kan., 310 tons, steam-electric station, to Ben Sibbitt Iron & Foundry Co., Wichita, Kan.

Crowell, Neb., 178 tons, highway bridge, to Illinois Steel Bridge Co., Jacksonville, Ill.

WESTERN STATES

St. Regis, Mont., 430 tons, bridge, to Virginia Bridge Co., Roanoke, Va.

Flathead County, Mont., 365 tons, bridge, to Minneapolis-Moline Power Implement Co., Minneapolis.

Boulder Canyon Project, 144 tons, radial gates, to Pacific Iron & Steel Co., Ltd., Los Angeles.

Glendale, Cal., 240 tons, Southern California Telephone Co. building, to Virginia Bridge Co., Roanoke, Va.

NEW STRUCTURAL STEEL PROJECTS

NORTH ATLANTIC STATES

Hartford, Conn., 215 tons, apartment building.

Warwick, R. I., 300 tons, city airport.

North Providence, R. I., 120 tons, high school.

New York, 475 tons, public school No. 119 in Bronx; bids in.

Queens, N. Y., 225 tons, public school No. 134; bids in.

Queens, N. Y., 2560 tons, lift bridge and grade elimination for Bronx-Whitestone bridge; James Stewart & Co., low bidders.

Brooklyn, 1500 tons, Brooklyn Central Library.

Flushing, N. Y., 150 tons,. State highway bridge WF-37-7.

Orange County, N. Y., 150 tons, State highway bridge.

Bayville, N. Y., 500 tons, Nassau County bridge.

St. Albans, N. Y., 550 tons, St. Pascal Church convent and school.

Riverhead, N. Y., 380 tons, State grade separation bridge RC-2500-3929.

Lynbrook, N. Y., 6000 tons, grade crossing elimination, Long Island Railroad Co.

Dundee, N. Y., 140 tons; bids taken Dec. 10.

Madison, N. J., 170 tons, library building, Drew University.

Philadelphia, 130 tons, board plant and warehouse additions, U. S. Gypsum Co.

Harrisburg, Pa., 100 tons, hospital; bids Dec. 21.

Trenton, N. J., 500 tons, Montgomery Ward store; bids Dec. 21.

Pittsburgh, 500 tons, Coca-Cola Co. bottling plant.

Baltimore, 330 tons, S. S. Kresge Co. store building.

Hancock, Md., 2800 tons, Wichert continuous bridge over Potomac River.

THE SOUTH

Port Royal, S. C., 275 tons, bridge.

Baton Rouge, La., 800 tons, Louisiana Steam & Generating Corp.

Mobile, Ala., 500 tons, Aluminum Co. plant.

Gunthersville, Ala., 250 tons, overhead cranes.

CENTRAL STATES

Detroit, 585 tons, building for Divco Twin Truck Co.

Cleveland, 300 tons, Cuyahoga Heights school building; bids rejected, to be readvertised.

Niles Center, Ill., 182 tons, school; bids taken Dec. 13.

Peru, Ill., 150 tons, school.

Elgin, Ill., 200 tons, school; bids taken Dec. 15.

Waterloo, Iowa, 180 tons, Montgomery Ward building.

WESTERN STATES

Coconino County, Ariz., 255 tons, Wilson Canyon bridge; bids Dec. 28.

(CONTINUED ON PAGE 113)

. . . CLEVELAND . . .

. . . Ingot rate up at Cleveland, lower at Youngstown.

o o o

. . . Demand for finished steel shows a slight improvement.

o o o

. . . Stocks of some consumers are now believed to be below normal.

CLEVELAND, Dec. 13.—Ingot output in the Cleveland-Lorain district will show a two-point gain to 33 per cent of capacity this week due to the mid-week resumption of two open-hearth furnaces at the local plant of the Republic Steel Corp. In the Youngstown district production has declined two points to 27 per cent of capacity.

Demand for finished steel for the first time in several weeks shows a definite, although a slight, improvement. More incoming business is reported by nearly all producers. While orders are quite numerous, all are small, few being for more than car lots. Consumers are buying to fill in stocks, many of which are now below normal.

In many cases buyers wait until they are in need of steel and shop around, giving the order to the mill that can make the best delivery. With the holidays near at hand, there is little expectation that the increase in business will be maintained during the last half of the month. However, a sustained upturn is looked for early in January.

Agricultural implement manufacturers and miscellaneous consumers are ordering steel a little more freely. Demand from the motor car industry continues to drag, showing no improvement. Some of the automobile parts plants are doing little at present, having been operating at a higher production rate than warranted by the motor car output. These, having built up stock, have slowed down until they secure new releases.

Activity in the construction field is very light. A spurt in orders for reinforcing bars is resulting from the announcement of Dec. 20 as the deadline for closing for steel for identified projects, for which quotations are outstanding, presumably at prices lower than established quotations.

Railroads are expected to remain inactive until a decision is announced on their request for freight advances.

While the local scrap market does not show any firmer tone, price declines seem to have been checked.

Pig Iron

Pig iron sales and shipments continue slack, and from present indications considerable tonnage will be carried over on producers' books into the first quarter of 1938. The agricultural implement industry remains fairly active, but automotive and other consumers are in no hurry for iron at present. One additional merchant furnace in the Lake district is expected to be banked this week.

Iron Ore

Some ore mining companies in the Lake Superior district are slowing down operations of their underground mines because, with the large stocks accumulated by consumers this year, the amount of ore to be shipped during 1938 probably will be considerably less than during the present year. Stock piles at these mines were well cleaned up this year.

Bolts, Nuts and Rivets

Little business is coming from either consumers or jobbers. Backlogs have been about wiped out and production has been further curtailed. It is estimated that the industry is now operating at about 30 per cent of capacity. Orders from the motor car industry are small and other buyers are limiting their purchases to fill-in orders. Some buyers are holding back because they think that prices may decline. Rivet manufacturers are hopeful of an increased activity in the railroad equipment field which will stimulate the demand for their product, which at present is very light.

Bars, Plates and Shapes

Demand for merchant bars is a little more active than during the past few weeks. All orders are for small lots for filling in stocks. Business from the motor car industry continues very slack. Orders for structural shapes are slightly better, although there is almost a total absence of new building projects outside of a few requiring very small lots. Plates continue dull. Lake shipyards expect to have boat repair work early in the year that will require some plate tonnage. Reinforcing bar business has been stimulated considerably by the new price set-up under which contracts based on outstanding quotations covering identified projects must be closed by Dec. 20. Makers seem hopeful that shading below the published prices that has long prevailed will be eliminated.

Sheets and Strip

Despite the fact that inventories of many consumers are out of balance and below normal levels, replacement orders are still infrequent. Sellers are doubtful that any real improvement can be shown over the remainder of this month, but hope for an upturn in January. While automotive and miscellaneous specifications have been negligible recently, refrigerator manufacturers have managed to maintain a fair rate of activity. Hot and cold rolled strip steel producers report that many parts makers have reduced their operations owing to the fact that orders originally scheduled for December shipment have been delayed until after the first of next year. Inventories of some strip consumers are said to be insufficient for more than 10 days' or two weeks' operations. At the opening of bids recently by the State of Ohio for 300 tons of one-pass cold rolled sheets for 1939 license tags, it was found that a Youngstown jobber quoted 3.79c. while nine mills bid the regular price of 3.82c.

... Sentiment more hopeful but business has not improved.

BOSTON, Dec. 14. — A small amount of Indian iron sold, but sales of domestic brands were very few and quite small the past week. Sentiment among melters appears more optimistic than it has been in months despite the fact that foundry operations have decreased slightly since last reports. The better feeling evidently is based on the improvement in scrap, as slight pickup in such fundamental New England industries as woolen goods and shoe manufacturing, and the fact that workable material inventories, particularly in metals and allied lines, will not be burdensome by Jan. 1.

Current buying of reinforcing steel is in less than 100-ton lots, but in the aggregate fairly satisfactory. There has been a noticeable letdown in the fabricated steel industry. Warehouses report buying in very small quantities. Unemployment in all New England States is increasing.

... 5000 tons of steel in Grand Coulee Dam.

SAN FRANCISCO, Dec. 14.— Bids on Grand Coulee Dam continued to hold the center of attention this week as the Bureau of Reclamation announced that it would open bids Jan. 4 on 20 bulkhead gate frame and track units for installation at the inlet ends of the outlet conduits from elevation 975 to elevation 1206; three bulkhead gate frame and track units for installation at the inlet ends of station-service penstocks; and 18 complete gate frames for the penstock inlet gates at the inlet ends of the main power penstocks. Over 5000 tons of steel will probable be required for this phase of the work.

At Los Angeles, the Department of Water and Power announced that Bethlehem Steel Co. is low bidder on a large crane extension runway.

Two large reinforcing bar projects were announced in the Hawaiian Islands. The Hickman Field barracks and warehouse will require 750 tons and the Kapalana Flood Control project involves 500 tons.

Tacoma, Wash., awarded about 500 tons of 36 and 48-in. pipe to the Hydraulic Equipment & Supply Co., Seattle. About 900 tons of 4, 6, and 12-in. steel pipe will be purchased by the King County, Wash., Board of Water Commissioners from the Crane Co.

In spite of the fair size of several projects, volume of steel buying has been very light. Unless improvement is noted within the next fortnight several open hearth furnaces are scheduled to be taken off.

Cleveland will take bids soon for about 1000 tons of 24 to 48-in. steel pipe for main water line in Harvard Avenue, connecting with city reservoir at Warrensville. Entire project will cost close to $250,000. L. A. Quayle, City Hall, is city engineer in charge.

McBride Gas Association, McBride, Mich., now being formed as a cooperative organization by local interests, plans welded steel pipe line from Home-Day gas field, about four miles distant, for natural gas transmission to municipality. Steel pipe lines will be installed for local distribution, with control station. It is proposed to begin work soon.

Bay Pipe Line Corp., 205 Bearinger Building, Saginaw, Mich., has let contract to Rich Construction Co., Bradford, Pa., for 6-in. welded steel pipe line from oil field in Buckeye Township, Gladwin County, Mich., to Bay City, Mich., about 33 miles, for crude oil transmission to new refinery to be built at latter place by Bay Refinery Corp., an affiliated organization. Cost close to $200,000. Booster pumping stations will be installed along route. Company was formed recently with capital of $250,000 and is associated with Gordon Oil Co., Hersee Building, Mount Pleasant, Mich. H. D. Atha is president.

Chemical Warfare Service, Edgewood Arsenal, Edgewood, Md., asks bids until Dec. 21 for 500 ft. of 2-in. steel pipe and 200 ft. of 4-in. galvanized steel pipe; also for 50 ft. of 4-in. cast iron pipe (Circular 174).

E. L. Buckley & Associates, Bedell Building, San Antonio, Tex., have plans for three 4 to 6-in. welded steel pipe lines to oil fields in North Sweden, Seven Sisters and Prement districts, for main feeder lines for crude oil transmission to bulk terminal, total distance of about 65 miles. Pumping stations will be installed at different points for booster service. It is proposed to begin work early in 1938. Cost close to $200,000.

Sabinal, Tex., has rejected bids recently received for pipe lines for municipal natural gas distribution and will ask new bids early next year. Cost about $35,000. Joseph J. Rady, Majestic Building, Fort Worth, Tex., is consulting engineer.

Lone Star Gas Corp., Dallas, Tex., and its subsidiaries, Lone Star Gas Co. and Community Natural Gas Co., have secured permission to acquire natural gas production, transmission and distribution pipe lines and facilities of Texas Public Service Co., West Texas Power Co., and Texas Public Service Production Corp., all subsidiaries of Peoples Light & Power Corp., and will operate as part of regular system in future. Pipe line extensions are planned for connection in company lines and acquired system.

United States Engineer Office, Federal Building, Buffalo, asks bids until Dec. 23 for steel pipe bushings; also wrought iron pipe, couplings, unions, plugs, tees, etc. (Circular 86).

King County, Wash., Board of Water Commissioners, has awarded about 900 tons of 4,6 and 12-in. pipe and fittings to Crane Co.

Pleasanton, Tex., closes bids about Dec. 28 for 4, 6 and 8-in. for water system; also for elevated steel tank and tower, valves, fittings and other waterworks equipment. Cost about $44,500. Garrett Engineering Co., Houston, Tex., is consulting engineer.

Monroe City, Mo., has plans for about 17,000 ft. of various sizes for extensions in water system; also for pumping plant and other waterworks installation. Cost close to $40,000. W. B. Rollins & Co., Railway Exchange Building, Kansas City, Mo., are consulting engineers.

Rome, N. Y., plans main water feeder line in Rome-Taeberg Road. Cost about $40,000; also will make extensions and improvements in waterworks pumping station at Ridge Mills, including new equipment. Cost about $25,000.

Montclair, N. J., plans about 5000 ft. of 12-in. in Normal Avenue and Valley Road, Upper Montclair, and about 7000 ft. of 8-in. in Grove Street, for main water supply, replacing in part present lines.

Bossier City, La., plans about 14 miles of 16-in. for main water line from reservoir to city; also new water treatment plant, pumping station and other waterworks installation. Entire project will cost close to $350,000. Garrett Engineering Co., Houston, Tex., is consulting engineer.

Wadsworth, Ohio, plans pipe lines for water system; also elevated steel tank and tower, and other waterworks installation. Cost close to $40,000. Barstow & LeFeber, 31 North Summit Street, Akron, Ohio, are consulting engineers.

Abingdon, Va., will receive bids Dec. 21 for pipe lines for water system and other waterworks equipment. J. B. McCrary Co., Inc., Atlanta, Ga., is consulting engineer.

Benton, La., will ask bids soon for pipe lines for water system and other waterworks installation. R. L. Tatum, Levy Building, Shreveport, La., is consulting engineer.

Wheeling, W. Va., will ask bids soon for 12-in. for main water feeder lines in several streets in Edgewood and Woodsdale districts. Cost about $70,000. Financing has been arranged through Federal aid.

Holtville, Cal., has awarded 140 tons of 16-in. pipe to United States Pipe & Foundry Co., Los Angeles.

Redding, Cal., has postponed bidding indefinitely on 195 tons of 18-in. pipe, pending litigation.

San Bernardino, Cal., Board of Water Commissioners, has announced that National Cast Iron Pipe Co., Los Angeles, is low bidder on 181 tons of 4, 6 and 8-in. pipe.

Vancouver, Wash., has opened bids on four alternate schedules calling for from 250 to 825 tons cast iron pipe; American Cast Iron Pipe Co., Seattle, is low bidder on three schedules; United States Pipe & Foundry Co., Seattle, is low bidder on one schedule.

Seattle, Wash., has recommended award of general contract on work calling for 1175 tons of cast iron (alternate transite) pipe to Queen City Construction Co., Seattle.

. . . . NEW YORK. . . .

. . . A slight improvement in bookings reported by some offices.

o o o

. . . Midtown underpass, New York, to take 60,000 tons of steel.

o o o

. . . School building program will require 20,000 tons.

NEW YORK, Dec. 14.—District sales offices of two steel manufacturers reported that bookings in the first 13 days of December were slightly above bookings for the similar period in November, the first time in many months that such a favorable comparison could be reported. In both instances, however, the total tonnages of steel to be supplied were not substantial and the improvement over last month did little but suggest that steel purchasing and production may be scraping bottom. Other steel companies indicate their sales in the New York area are barely at a level with November at this date or have shown a further decline.

How soon an upswing can be expected is uncertain but district sellers look for some measure of improvement in January. Some large jobbers here have stocks which still seem substantial, although small jobbers are more frequently entering the market for steel, generally for small tonnages for immediate shipment.

Steel sellers in this area are growing less willing to predict that in two weeks, four weeks or any other definite period, consumers will find their yards and warehouses bare of steel and be forced to enter the market with tonnages that will result in a swift upturn in operations at the mills.

Inability of business generally to realize the size of inventories built up during the early months of 1937 in expectation of higher prices and a stoppage of material shipments by strikes has made forecasters cautious even after several months of declining operations, an abnormally low demand for steel and despite a steel consuming rate substantially higher than the rate of ingot output.

Among the more obvious requirements of a real recovery in demand for steel products, and a reviving of business generally, is a settlement of some or all of the controversies between business leaders and President Roosevelt as to labor and tax legislation affecting business. Granting by the Interstate Commerce Commission of all or nearly all of the 15 per cent freight rate advance asked by the railroads is another anticipated development which may help steel buying early in 1938.

Of interest here is the large number of inquiries for steel products of all kinds from abroad and the substantial business which is being placed for export.

A further decline in requirements for structural steel is expected and slackness in building has made a further reduction in demand for such products as butt weld pipe.

Plans calling for construction of 24 new elementary school buildings and modernization of several existing schools were announced recently by the New York City Board of Education. These plans have been submitted to the New York Board of Estimate for approval and may provide an outlet for an estimated 20,000 tons of shapes. Bar tonnages will be limited due to the form of construction adopted by the board in its school buildings.

The New York Board of Estimate has approved plans for construction of the $30,000,000 midtown underpass, a project, under the authority of the borough president of Manhattan, which will take approximately 60,000 tons of steel.

Pig Iron

Although buying at this time of the year is invariably very light as consumers strive for low raw material inventories for the end of the year, conditions in the market at present have touched new lows for this season. Current buying is limited entirely to small fill-in lots. Shipments are running between 15 and 20 per cent below November, and tapering foundry activity indicates a still further recession in deliveries. A number of new export inquiries developed during the week for lots ranging from 50 to 2000 tons. These proposals originated in widely separated countries and aggregate about 3500 tons.

Reinforcing Bars

There has been noticeable increase in the number of small jobs coming out, but as this work is mostly under 75 tons, the total involved is small. Plant additions and road work account for the bulk of these small jobs. Low bidder on both forms of contract for the lift bridge and Northern Boulevard grade crossing elimination work for the Bronx-Whitestone bridge, calling for 313 tons of bars, was the James Stewart Construction Co., New York.

Plates and Sheets

There is little change in the plate market, which continues to bump along the bottom, although one seller reports a slightly improved situation.

Sheet sales are somewhat more active, and at least one district office reports a pickup over the volume of new business placed in recent weeks. Largest transaction of the past week was the awarding of a contract to supply 488 tons of

24-gage hot rolled, pickled annealed, resquared sheets by the State of New York. The material is to be used for the manufacture of license plates by convict labor at the State prison at Auburn. Egleston Brothers & Co., Inc., a jobber of Long Island City, N. Y., was low bidder at $3.94 per 100 lb. delivered. Most sheet producers quoted $4.14, delivered.

Some complaint has been heard of the larger jobbers of galvanized sheets acting as distributers in supplying smaller jobbers with bundle lots at their own carload buying price plus 5c. per 100 lb. for trucking, saving the latter the quantity extras and the higher freight charges on l.c.l. shipments. With the year end approaching, the larger jobbers are apparently using this means of reducing their inventories and converting stock into cash.

. . PHILADELPHIA . .

. . . Operations unchanged at 30 per cent.

o o o

. . . Navy work goes to New York Shipbuilding Corp.

o o o

. . . Colonial furnace banked; pig iron listless.

PHILADELPHIA, Dec. 14.—The operating situation in this territory has undergone no change during the past week; therefore the average district rate is retained at 30 per cent of theoretical capacity. During the last two weeks of December, more than one mill here plans to close down practically completely, partly for repairs and partly because of the lack of rolling orders. Although new business naturally will not bulge the first day after the turn of the year, there is every indication that this district will open up January with operations between 30 and 35 per cent. No sharp increase over this figure is anticipated over the remainder of the month.

During the past fortnight, the undertone of this district has gone through a complete reversal, with sentiment now to the effect that much of the deflationary cycle has been washed out, and conditions from now on should mend, perhaps slowly but mend monetheless.

Pig Iron

As the year-end holiday and inventory period approaches, foundries are naturally trying to restrict shipments to even a greater extent than had previously been the case. Nonetheless, some have been forced into the market for odd-lots of fill-in analyses, although the total turnover on this new business combined with scattered contract shipments has not by far balanced output in this area. The result has been some stocking at district stacks, and the Colonial furnace has banked its comparatively small unit as yard stocks have built up to an estimated 13,000 tons. The pig iron situation abroad has eased considerably, what with better production in England and heavier tonnages available on the Continent. The result is that producers in this country can hardly expect much additional inquiry from abroad, and there might even be an accelerated flow of competitive iron into this country in the new year.

Sheets & Strip

More than one plant has reported more orders during the week for a slightly greater aggregate tonnage than in previous weeks. This trend seems to have some backbone, although the improvement has certainly not been sufficient to be reflected in better open hearth activity. Certain sheet sizes are overstocked in this territory whereas consumers are being forced into the market to round out requirements in other sizes. The concensus of market sentiment is that the first two weeks of January will show little activity, but from then on demands are expected to show a moderate but steadily increasing pace.

Plates & Shapes

The New York Shipbuilding Corp. will be in the market for about 12,000 tons of plates, shapes and bars over the next two years for the recently awarded Navy destroyer and seaplane tenders. No decision regarding the Standard Oil tankers has yet been made, but there is every possibility that one to five may come to this district. The decision of the ICC to withhold temporary rate advances will probably delay railroad buying considerably, although it is still believed here that actual increases will be allowed sometime late in the first quarter. In the meantime requisitions for routine requirements continue to buil up in railroad offices, and the steel industry seems to have some justification in its belief that the carriers will give the market considerable support in the coming year. Demand for fabricated shapes is deriving its total support from public works, as all private construction has been frightened into hiding. The only award of the week called for 150 tons for a Philadelphia armory, placed with Bethlehem. New projects include 3000 tons of shapes and 400 tons of bars for a Farm Show building at Harrisburg, on which bids are due Dec. 23, 300 tons of shapes and 100 tons of bars for a hospital at Harrisburg, to be bid Dec. 21, and 500 tons of shapes for a store building at Trenton. Reinforcing awards during the week totaled 350 tons for a hospital at Elizabethtown and a bridge in Montgomery County, both going to Bethlehem.

Imports

The following iron and steel imports were received here during the past week: 1416 tons of pig iron from British India; 103 tons of sponge iron, 46 tons of wire rods, 170 tons of steel tubes, 41 tons of steel forgings and 73 tons of steel bars from Sweden.

Congdon & Carpenter Co. Opens Branch Warehouse

CONGDON & CARPENTER CO., Providence, R. I., has just occupied a new branch warehouse for distributing steel, sheet metals and industrial supplies at 583 Bedford Street, Fall River, Mass.

The building is divided lengthwise into two bays which will contain storage space for sheet steel, bar steel and structural shapes, an overhead crane, loading platform and a squaring shear, saws, punches, and a cutting off machine for sheets and merchant bars.

. . .NON-FERROUS. . .

. . . *Copper prices lowered to 10.25c.*

o o o

. . . *Tin export quota cut to 70 per cent.*

NEW YORK, Dec. 13.—A further cut in electrolytic copper quotations by custom smelters on Thursday, bringing prices down to 10.25c. per lb., Connecticut Valley, developed an encouraging volume of buying by independent consumers. Domestic sales, since the new price was established, have been averaging about 1700 tons per day, as compared with 900 tons per day when the 10.75c. level prevailed. Producers' prices have remained unchanged at 11c. The predominance of December and January delivery specifications on current sales suggests that consumers' reserves are very low. If this is the condition, it means that the copper market is in a particularly sensitive position, and any improvement in business sentiment will bring an immediate improvement in copper sales. The export market was moderately active during the week, with today's export basis of 10.05c. per lb., c.i.f., usual Continental base ports, being 33 points below last week's price.

Lead

Moderate buying of nearby positions at a steady and unchanged price of 5c. per lb., New York, characterized the market during the past week. December requirements are estimated to be 90 per cent covered, while January needs are only 35 per cent specified. Consumption at present is running about 35,000 tons per month. London prices were up slightly over the week end, today's equivalent ranging betweeen 3.63c. and 3.67c. per lb.

Zinc

Consumer demand continues in fair volume with prime Western sales for the week estimated at 1100 tons, as compared with 1300 tons in the preceding week. Quotations are unchanged at 5.35c. per lb., New York. The American Zinc Institute reports that prime Western sales in November, calling for delivery in that month, totaled 1925 tons and sold at an average weighted price of 5.656c. per lb., East St. Louis, as against 1813 tons at an average price of 6.233c. per lb. in October. November sales for future delivery totaled 437 tons at an average price of 5.36c., while in October futures sales amounted to 1085 tons at an average price of 5.93c. per lb.

Tin

Export quotas for the first quarter were set at 70 per cent of standard tonnages at the recent meeting of the tin control committee. On paper this represents a drop of 36.3 per cent, or 79,950 tons per year from the present quota of 110 per cent, but based on the actual exports of the countries under the control plan, which have been exporting at the rate of 85 per cent over the past 12 months, it will mean a reduction of 17.6 per cent, or 35,000 tons a year. Marketwise, this announcement has had little effect, the market continuing inactive all week with quotations moving in a limited range. Today's Straits quotation of 44.125c. per lb., New York, is 0.375c. below the price of a week ago.

The Week's Prices. Cents Per Pound for Early Delivery

	Dec. 8	Dec. 9	Dec. 10	Dec. 11	Dec. 13
Electrolytic Copper, Conn.*	10.50	10.25	10.25	10.25	10.25
Lake copper, N. Y.	11.125	11.125	11.125	11.125	11.125
Straits tin, spot, New York	43.75	44.00	44.75	....	44.125
Zinc, East St. Louis	5.00	5.00	5.00	5.00	5.00
Zinc, New York	5.35	5.35	5.35	5.35	5.35
Lead, St. Louis	4.85	4.85	4.85	4.85	4.85
Lead, New York	5.00	5.00	5.00	5.00	5.00

*Delivered Connecticut Valley; price ¼c. lower delivered in New York.
Aluminum, virgin, 99 per cent plus 20.00c.-21.00c. a lb. delivered.
Aluminum No. 12 remelt No. 2 standard, in carloads, 19.00c. to 19.50c. a lb., delivered.
Nickel, electrolyic, 35c. to 36c. a lb. base refinery, in lots of 2 tons or more.
Antimony, Asiatic, 14.25c. a lb., prompt, f.o.b., New York.
Antimony, American, 14.25c. per lb., prompt shipment, New York.
Quicksilver, $83.00 to $85.00 per flask of 76 lb.
Brass ingots, commercial 85-5-5-5, 11.25c. a lb., less carload, delivered in Middle West ¼c. a lb. is added on orders for less than 40,000 lb.

From New York Warehouse

Delivered Prices, Base per Lb.

Tin, Straits pig	45.50c. to 46.50c.
Tin, bar	47.50c. to 48.50c.
Copper, Lake	12.75c. to 13.75c.
Copper, electrolytic	12.75c. to 13.75c.
Copper, castings	12.50c. to 13.50c.
*Copper sheets, hot-rolled	19.125c.
*High brass sheets	17.375c.
*Seamless brass tubes	20.125c.
*Seamless copper tubes	19.875c.
*Brass rods	13.375c.
Zinc, slabs	6.75c. to 7.75c.
Zinc, sheets (No. 9), casks, 1200 lb. and over	12.00c.
Lead, American pig	6.00c. to 7.00c.
Lead, bar	7.25c. to 8.25c.
Lead, sheets, cut	8.50c.
Antimony, Asiatic	16.75c. to 17.75c.
Alum., virgin, 99 per cent plus	22.50c. to 24.00c.
Alum., No. 1 for remelting, 98 to 99 per cent	19.50c. to 21.00c.
Solder, ½ and ½	31.00c. to 33.00c.
Babbitt metal, commercial grade	20.00c. to 60.00c.

*These prices, which are also for delivery from Chicago and Cleveland warehouses, are quoted with 25 per cent allowed off for extras, except copper sheets and brass rods, on which allowance is 40 per cent.

From Cleveland Warehouse

Delivered Prices per Lb.

Tin, Straits pig	48.875c.
Tin, bar	50.875c.
Copper, Lake	12.00c. to 12.25c.
Copper, electrolytic	12.00c. to 12.25c.
Copper, castings	11.50c. to 11.75c.
Zinc, slabs	8.25c. to 8.50c.
Lead, American pig	5.50c. to 5.75c.
Lead, bar	9.00c.
Antimony, Asiatic	17.25c. to 17.75c.
Babbitt metal, medium grade	19.50c.
Babbitt metal, high grade	50.875c.
Solder, ½ and ½	27.50c.

Old Metals, Per Lb., New York

Buying prices are paid by dealers for miscellaneous lots from smaller accumulators and selling prices are those charged to consumers after the metal has been prepared for their uses. (All prices are nominal.)

	Dealers' Buying Prices	Dealers' Selling Prices
Copper, hvy. crucible	7.875c.	8.625c.
Copper, hvy. and wire	7.25c.	7.75c.
Copper, light and bottoms	6.25c.	6.50c.
Brass, heavy	4.375c.	5.00c.
Brass, light	3.375c.	4.125c.
Hvy. machine composition	6.875c.	7.375c.
No. 1 yel. brass turnings	4.75c.	5.25c.
No. 1 red brass or compos. turnings	6.50c.	7.00c.
Lead, heavy	4.00c.	4.375c.
Cast aluminum	10.625c.	11.75c.
Sheet aluminum	12.00c.	13.50c.
Zinc	2.875c.	3.125c.

IRON AND STEEL SCRAP

. . . Market tone is stronger as mills buy in small quantity and release some shipments on old orders.

o o o

. . . Composite advances 34c. to $13.42.

DEC. 14. — Releasing of shipments by one Chicago district mill has resulted in higher dealer bids and an advance of 50c. in quotations. Coverage of two orders at Pittsburgh established a price of $13.50 to $14 for No. 1 steel there and raised the average 50c. With no change at Philadelphia, THE IRON AGE composite price has risen 34c. to $13.42 and is 50c. above the low point of $12.92 last reported on Nov. 30. The entire list at Chicago has been advanced 50c. and similar gains have been recorded on a few items at Detroit, where dealers are laying down all automotive scrap. At Buffalo, the largest consumer has lifted restrictions on shipments on high-priced material on old order and has allotted new orders at prices $5 lower so as to average out its purchases.

Export prices are firm and unchanged in all principal markets.

Pittsburgh

Two sales of No. 1 steel have been made into consumption during the past week. Some brokers were paying as much as $13.25 and $13.50 to cover a 3000-ton order, and another lot of 1500 tons of No. 1 steel was sold for $14, delivered at mill. The same consumer also bought some scrap rails for $15.25 a ton, delivered. Hence, No. 1 steel is being quoted this week at $13.50 to $14, an advance of 50c. The present strength in the market probably looks more important than actual conditions would warrant, owing to the exceptional dull period during the last several months. One large buyer of scrap who had let up on restrictions during the last several weeks has found it necessary again to place embargoes on all shipments, with minor exceptions.

Chicago

Although there have been no mill sales yet, the action of one large producer here in releasing shipments after several weeks suspension has had a strengthening effect on the market. Brokers bids to dealers are higher consequently, as they cover on old orders. As high as $13 has been bid for carloads of heavy melting steel, according to one broker, with the response none too enthusiastic. The price of No. 1 has been increased 50c. a ton to $12 to $12.50, with proportionate advances throughout the remainder of the list. A railroad list last week brought around $12.75 a gross ton delivered, and it is expected that the next railroad sale, in a week or 10 days, will bring between $13 and $13.25 gross.

Cleveland

Scrap quotations are unchanged, with No. 1 heavy melting steel holding at $12 to $12.50 per ton in the absence of activity. While it appears unlikely that there will be much mill buying until well after the start of the next year, it is believed in many quarters that the market is scraping bottom. Only one mill has been taking any scrap at all recently and others indicate they may not be in the market for some time. A special list including approximately 2000 tons of heavy melting steel and 10,000 tons of rails was offered by the Baltimore & Ohio Railroad. Sale of the Lake Shore Electric Railway at public auction in Sandusky, Ohio, Jan. 4, offers possibilities for one of the largest scrapping operations in some time in this district. Approximately 20,000 tons of 60 to 70-lb. rails, numerous passenger and freight cars and large quantities of wire and machinery are to be sold.

Buffalo

The largest consumer here has made a compromise arrangement with dealers who have high-priced orders on their books and who have been restricted from shipping material over the past two months. Allotting these dealers new orders at $13 for No. 1 heavy melting steel and $11 for No. 2 and allied grades, the mill has agreed to take shipment on the older orders, many of which were taken at around $18 and higher. This arrangement permits many dealers to better their financial position and results in the mill being able to average down its orders at what it believes to be the market, though many dealers ordinarily would not sell at these prices, and are loath to make large new commitments. While the buyer expects to obtain 10,000 tons, it is reported the net tonnage sold by dealers at the week-end was not more than 4000.

St. Louis

While there was no buying of scrap iron during the last week and prices are nominally unchanged, the market in St. Louis is stronger than it has been for some time. This strength is based on confidence that conditions will improve, plus low inventories of scrap by the mills, which should lead to a buying movement immediately after inventories for 1937 have been completed.

Cincinnati

Trading in old materials has all but taken a holiday. The market is steadily quiet and, although no change has been made in quotations the past week, lists are nominal. Dealers make few offerings since they prefer to hold material.

Detroit

Still lacking in pronounced activity, the Detroit market has nevertheless taken an upward turn, with interest keyed up by prices brought on recent automotive lists. Local mills still are not buying, but dealers feel capable of taking all the scrap produced in this area in view of the reduced schedules of the automotive producers. A little angling for scrap for outside mills is rumored. It has been learned that much of the scrap bought on the recent lists and laid down covers an order for spring delivery at a Lake Erie port.

New York

The situation is virtually unchanged, but there is considerably better feeling among the trade. Export buying prices are unchanged for the seventh consecutive week. Based on a sale into consumption in eastern Pennsylvania, the price on No. 1 heavy melting steel on cars is quoted at $10.50 to $11, and $1.50 less for No. 2, resulting in a rise of 50c. over previously published prices, but still several dollars below prices for export materials.

Boston

Bundled skeleton for Pennsylvania delivery is 60c. a ton higher at $6.60 a ton on cars, and moving in small lots. One domestic consumer is offering $2.50 a ton on cars for steel blast furnace turnings, and another $3.50, but no actual sales are reported. Small amounts of breakable cast have been moved to eastern Pennsylvania at $8.50 a ton on cars, the first sales reported in a long time. Otherwise the domestic movement is at a standstill. In contrast, the export market continues active and firm at unchanged prices.

Iron and Steel Scrap Prices

PITTSBURGH

Per gross ton to delivered to consumer:

No. 1 hvy. mltng. steel	$13.50 to	$14.00
Railroad hvy. mltng.	14.50 to	15.00
No. 2 hvy. mltng. steel	12.00 to	12.50
Scrap rails	14.75 to	15.25
Rails 3 ft. and under	18.00 to	18.50
Comp. sheet steel	13.50 to	14.00
Hand bundled sheets	12.50 to	13.00
Hvy. steel axle turn.	11.50 to	12.00
Machine shop turn	7.00 to	7.50
Short shov. turn.	7.00 to	7.50
Mixed bor. & turn	6.50 to	7.00
Cast iron borings	6.50 to	7.00
Cast iron carwheels	15.00 to	15.50
Hvy. breakable cast	12.50 to	13.00
No. 1 cupola cast	16.00 to	16.50
RR. knuckles & cplrs.	17.50 to	18.00
Rail coil & leaf springs	17.50 to	18.00
Rolled steel wheels	17.50 to	18.00
Low phos. billet crops	18.00 to	18.50
Low phos. sh. bar	17.50 to	18.00
Low phos. punchings	16.50 to	17.00
Low phos. plate, hvy.	17.00 to	17.50
Low phos. plate clips	14.50 to	15.00
Steel car axles	17.50 to	18.00

PHILADELPHIA

Per gross ton to delivered to consumer:

No. 1 hvy. mltng. steel	$14.00 to	$14.50
No. 2 hvy. mltng. steel	12.50 to	13.00
Hydraulic bund., new	14.00 to	14.50
Hydraulic bund., old	10.00 to	10.50
Steel rails for rolling	17.00 to	17.50
Cast iron carwheels	16.00 to	16.50
Hvy. breakable cast	14.00 to	14.50
No. 1 cast	16.50 to	17.00
Stove plate (steel wks.)	12.50 to	13.00
Railroad malleable	16.00 to	16.50
Machine shop turn	9.00 to	9.50
No. 1 blast furnace	8.25 to	8.75
Cast borings	8.50 to	9.00
Heavy axle turnings	11.00 to	11.50
No. 1 low phos. hvy.	18.00 to	18.50
Couplers & knuckles	18.00 to	18.50
Rolled steel wheels	18.00 to	18.50
Steel axles	20.00 to	20.50
Shafting	19.50 to	20.00
No. 1 RR. wrought	16.00 to	16.50
Spec. iron & steel pipe	13.00 to	13.50
No. 1 forge fire	12.00 to	12.50
Cast borings (chem.)	13.50 to	14.00

CHICAGO

Delivered to Chicago district consumers:

	Per Gross Ton	
Hvy. mltng. steel	$12.00 to	$12.50
Auto. hvy. mltng. steel alloy free	10.50 to	11.00
No. 2 auto. steel	10.00 to	10.50
Shoveling steel	12.00 to	12.50
Hydraul. comp. sheets	11.00 to	11.50
Drop forge flashings	9.50 to	10.00
No. 1 busheling	11.00 to	11.50
Rolled carwheels	15.50 to	16.00
Railroad tires, cut	15.75 to	16.25
Railroad leaf springs	16.50 to	17.00
Steel coup. & knuckles	15.50 to	16.00
Axle turnings	11.50 to	12.00
Coil springs	17.00 to	17.50
Axle turn. (elec.)	12.00 to	12.50
Low phos. punchings	15.50 to	16.00
Low phos. plates, 12 in. and under	15.00 to	15.50
Cast iron borings	7.50 to	8.00
Short shov. turnings	8.00 to	8.50
Machine shop turn	6.50 to	7.00
Rerolling rails	14.75 to	15.25
Steel rails under 3 ft.	15.00 to	15.50
Steel rails under 2 ft.	15.50 to	16.00
Angle bars, steel	14.75 to	15.25
Cast iron carwheels	14.75 to	15.25
Railroad malleable	14.25 to	14.75
Agric. malleable	11.75 to	12.25
	Per Net Ton	
Iron car axles	$19.00 to	$19.50
Steel car axles	17.00 to	17.50
No. 1 RR. wrought	10.00 to	10.50
No. 2 RR. wrought	10.75 to	11.25
No. 2 busheling, old	5.25 to	5.75
Locomotive tires	15.25 to	15.75
Pipes and flues	8.75 to	9.25
No. 1 machinery cast	11.75 to	12.25
Clean auto. cast	11.50 to	12.00
No. 1 railroad cast	10.75 to	11.25
No. 1 agric. cast	10.75 to	11.25
Stove plate	8.50 to	9.00
Grate bars	8.50 to	9.00
Brake shoes	8.00 to	8.50

YOUNGSTOWN

Per gross ton to delivered to consumer:

No. 1 hvy. mltng. steel	$13.00 to	$13.50
Hydraulic bundles	12.50 to	13.00
Machine shop turn	10.00 to	10.50

CLEVELAND

Per gross ton to delivered to consumer:

No. 1 hvy. mltng. steel	$12.00 to	$12.50
No. 2 hvy. mltng. steel	11.00 to	11.50
Comp. sheet steel	11.50 to	12.00
Light bund. stampings	8.50 to	9.00
Drop forge flashings	11.00 to	11.50
Machine shop turn	7.00 to	7.50
Short shov. turn.	8.50 to	9.00
No. 1 busheling	11.00 to	11.50
Steel axle turnings	9.50 to	10.00
Low phos. billet and bloom crops	18.50 to	19.50
Cast iron borings	8.50 to	9.00
Mixed bor. & turn.	8.50 to	9.00
No. 2 busheling	8.50 to	9.00
No. 1 cast	16.50 to	17.00
Railroad grate bars	8.00 to	8.50
Stove plate	8.00 to	8.50
Rails under 3 ft.	18.00 to	18.50
Rails for rolling	16.00 to	16.50
Railroad malleable	16.00 to	16.50
Cast iron carwheels	15.00 to	15.50

BUFFALO

Per gross ton, f.o.b. consumers' plants:

No. 1 hvy. mltng. steel	$13.00 to	$13.50
No. 2 hvy. mltng. steel	11.00 to	11.50
Scrap rails	13.00 to	13.50
New hvy. b'ndled sheets	11.00 to	11.50
Old hydraul. bundles	10.00 to	10.50
Drop forge flashings	11.00 to	11.50
No. 1 busheling	11.00 to	11.50
Hvy. axle turnings	11.50 to	12.00
Machine shop turn	7.00 to	7.50
Knuckles & couplers	16.50 to	17.00
Coil & leaf springs	16.50 to	17.00
Rolled steel wheels	16.50 to	17.00
Low phos. billet crops	17.50 to	18.00
Shov. turnings	9.50 to	10.00
Mixed bor. & turn	8.50 to	9.00
Cast iron borings	8.50 to	9.00
Steel car axles	16.50 to	17.00
No. 1 machinery cast	15.00 to	15.50
No. 1 cupola cast	14.00 to	14.50
Stove plate	12.00 to	12.50
Steel rails under 3 ft.	17.00 to	17.50
Cast iron carwheels	15.00 to	15.50
Railroad malleable	15.00 to	15.50
Chemical borings	10.50 to	11.00

ST. LOUIS

Dealers' buying prices per gross ton delivered to consumer:

Selected hvy. melting	$13.00 to	$13.50
No. 1 hvy. melting	13.00 to	13.50
No. 2 hvy. melting	12.00 to	12.50
No. 1 locomotive tires	16.00 to	16.50
Misc. stand.-sec. rails	13.00 to	13.50
Railroad springs	15.00 to	15.50
Bundled sheets	8.00 to	8.50
No. 1 busheling	7.00 to	7.50
Cast bor. & turn	6.00 to	6.50
Rails for rolling	13.50 to	14.00
Machine shop turn	6.00 to	6.50
Heavy turnings	8.50 to	9.00
Steel car axles	19.50 to	20.00
Iron car axles	21.50 to	22.00
No. 1 RR. wrought	8.00 to	8.50
No. 2 RR. wrought	13.00 to	13.50
Steel rails under 3 ft.	16.00 to	16.50
Steel angle bars	14.50 to	15.00
Cast iron carwheels	16.50 to	17.00
No. 1 machinery cast	12.75 to	13.25
Railroad malleable	15.00 to	15.50
No. 1 railroad cast	13.25 to	13.75
Stove plate	9.00 to	9.50
Agricul. malleable	10.00 to	10.50
Grate bars	11.25 to	11.75
Brake shoes	10.00 to	10.50

CINCINNATI

Dealers' buying prices per gross ton:

No. 1 hvy. mltng. steel	$9.50 to	$10.00
No. 2 hvy. mltng. steel	7.50 to	8.00
Scrap rails for mltng.	14.50 to	15.00
Loose sheet clippings	6.00 to	6.50
Hydrau. b'ndled sheets	9.50 to	10.00
Cast iron borings	3.50 to	4.00
Machine shop turn	4.00 to	4.50
No. 1 busheling	8.00 to	8.50
No. 2 busheling	3.00 to	3.50
Rails for rolling	16.50 to	17.00
No. 1 locomotive tires	13.00 to	13.50
Short rails	17.00 to	17.50
Cast iron carwheels	11.50 to	12.00
No. 1 machinery cast	10.50 to	11.00
No. 1 railroad cast	9.00 to	9.50
Burnt cast	5.50 to	6.00
Stove plate	5.50 to	6.00
Agricul. malleable	10.50 to	11.00
Railroad malleable	12.50 to	13.00
Mixed hvy. cast	7.50 to	8.00

BIRMINGHAM

Per gross ton delivered to consumer:

Hvy. melting steel	$16.00 to	$16.50
Scrap steel rails		17.00
Short shov. turnings		8.50
Stove plate		10.50
Steel axles	18.00 to	19.00
Iron axles	15.50 to	18.00
No. 1 RR. wrought	13.00 to	15.00
Rails for rolling	18.00 to	20.00
No. 1 cast	16.00 to	18.00
Tramcar wheels	16.00 to	18.00

DETROIT

Dealers' buying prices per gross ton:

No. 1 hvy. mltng. steel	$9.50 to	$10.00
No. 2 hvy. mltng. steel	8.00 to	8.50
Borings and turnings	6.25 to	6.75
Long turnings	5.75 to	6.25
Short shov. turnings	6.75 to	7.25
No. 1 machinery cast	11.75 to	12.25
Automotive cast	12.75 to	13.25
Hvy. breakable cast	10.25 to	10.75
Hydraul. comp. sheets	10.50 to	11.00
Stove plate	7.50 to	8.00
New factory bushel	9.50 to	10.00
Old No. 2 busheling	5.00 to	5.50
No. 2 busheling (black fender stock)		Nominal
Sheet clippings	7.00 to	7.50
Flashings	8.50 to	9.00
Low phos. plate scrap	10.50 to	11.00

NEW YORK

Dealers' buying prices per gross ton on cars:

No. 1 hvy. mltng. steel	$10.50 to	$11.00
No. 2 hvy. mltng steel	9.00 to	9.50
Hvy. breakable cast	9.50 to	10.00
No. 1 machinery cast	11.50 to	12.00
No. 2 cast	9.50 to	10.00
Stove plate	8.50 to	9.00
Steel car axles	19.00 to	19.50
Shafting	16.00 to	16.50
No. 1 RR. wrought	11.00 to	11.50
No. 1 wrought long	10.00 to	10.50
Spec. iron & steel pipe	9.00 to	9.50
Rails for rolling	16.00 to	16.50
Clean steel turnings	5.00 to	5.50
Cast borings	5.00 to	5.50
No. 1 blast furnace	5.00 to	5.50
Cast borings (chem.)	10.00 to	10.50
Unprepar. yard scrap	7.50 to	8.00

Per gross ton, delivered local foundries:

No. 1 machn. cast	$15.50 to	$16.00
No. 2 cast	11.00 to	11.50

BOSTON

Dealers' buying prices per gross ton:

No. 1 hvy. mltng. steel	$13.30 to	$13.80
Scrap rails	13.30 to	13.80
No. 2 steel	12.30 to	12.80
Breakable cast		8.50
Machine shop turn	2.50 to	3.50
Mixed bor. & turn	2.50 to	3.50
Bun. skeleton long		6.60
Shafting	17.50 to	18.00
Cast bor. chemical	8.00 to	8.50

Per gross ton delivered consumers' yards:

Textile cast	$15.50 to	$16.00
No. 1 machine cast	15.50 to	16.00

PACIFIC COAST

Per gross ton delivered to consumer:

No. 1 hvy. mltng. steel	$10.50 to	$11.00
No. 2 hvy. mltng. steel	9.50 to	10.00

CANADA

Dealers' buying prices at their yards, per gross ton:

	Toronto	Montreal
No. 1 hvy. mltng. steel	$14.50	$14.00
No. 2 hvy. mltng. steel	13.50	13.00
Mixed dealers steel	12.50	12.00
Scrap pipe	11.75	11.50
Steel turnings	9.75	9.50
Cast borings	11.00	10.50
Machinery cast	18.00	17.00
Dealers cast	16.00	15.00
Stove plate	13.00	11.00

EXPORT

Dealers' buying prices per gross ton:

New York, truck lots, delivered, barges		
No. 1 hvy. mltng. steel		$13.50
No. 2 hvy. mltng. steel		12.00
No. 2 cast		11.00
Stove plate	8.50 to	9.00
Boston on cars at Army Base or Mystic Wharf		
No. 1 hvy. mltng. steel		$14.00
No. 2 hvy. mltng steel		13.00
Rails (scrap)		14.00
Philadelphia, delivered alongside boats, Port Richmond		
No. 1 hvy. mltng. steel	$14.50 to	$15.00
No. 2 hvy. mltng. steel	13.50 to	14.00

PRICES ON FINISHED AND SEMI-FINISHED IRON AND STEEL

SEMI-FINISHED STEEL

Billets, Blooms and Slabs

F.o.b. Pittsburgh, Chicago, Gary, Cleveland, Youngstown, Buffalo, Birmingham. Prices at Duluth are $2 a ton higher, and delivered Detroit $3 higher.

	Per Gross Ton
Rerolling	$37.00
Forging quality	43.00

Sheet Bars

F.o.b. Pittsburgh, Chicago, Cleveland, Youngstown, Buffalo, Canton, Sparrows Point, Md.

	Per Gross Ton
Open-hearth or Bessemer	$37.00

Skelp

F.o.b. Pittsburgh, Chicago, Youngstown, Buffalo, Coatesville, Pa., Sparrows Point, Md.

	Per Lb.
Grooved, universal and sheared	2.10c.

Wire Rods
(No. 5 to 9/32 in.)

	Per Gross Ton
F.o.b. Pittsburgh or Cleveland	$47.00
F.o.b. Chicago, Youngstown or Anderson, Ind.	48.00
F.o.b. Worcester, Mass.	49.00
F.o.b. Birmingham	50.00
F.o.b. San Francisco	56.00
F.o.b. Galveston	53.00

Rods over 9/32 in. or 47/64 in., inclusive, $5 a ton over base.

BARS, PLATES, SHAPES

Iron and Steel Bars

Soft Steel

	Base per Lb.
F.o.b. Pittsburgh	2.45c.
F.o.b. Chicago or Gary	2.50c.
F.o.b. Duluth	2.60c.
Del'd Detroit	2.60c.
F.o.b. Cleveland	2.50c.
F.o.b. Buffalo	2.55c.
Del'd Philadelphia	2.74c.
Del'd New York	2.79c.
F.o.b. Birmingham	2.60c.
F.o.b. cars dock Gulf ports	2.85c.
F.o.b. cars Pacific Ports	3.00c.

Rail Steel
(For merchant trade)

F.o.b. Pittsburgh	2.30c
F.o.b. Cleveland, Chicago, Gary or Moline, Ill.	2.35c.
F.o.b. Buffalo	2.40c.
F.o.b. Birmingham	2.45c.
F.o.b. cars dock Gulf ports	2.70c.
F.o.b. cars dock Pacific ports	2.85c.

Billet Steel Reinforcing
(Straight lengths as quoted by distributers)

F.o.b. Pittsburgh	2.45c.
F.o.b. Buffalo, Cleveland, Youngstown, Chicago, Gary or Birmingham	2.50c.
Del'd Detroit	2.60c.
F.o.b. cars dock Gulf ports	2.85c.
F.o.b. cars dock Pacific ports	2.85c.

Rail Steel Reinforcing
(Straight lengths as quoted by distributers)

F.o.b. Pittsburgh	2.30c.
F.o.b. Buffalo, Cleveland, Youngstown, Chicago, Gary or Birmingham	2.35c.
F.o.b. cars dock Gulf ports	2.70c.
F.o.b. cars dock Pacific ports	2.70c.

Iron

F.o.b. Chicago	2.40c.
F.o.b. Pittsburgh (refined)	3.60c.

Cold Finished Bars and Shafting*

	Base per Lb.
F.o.b. Pittsburgh	2.90c.
F.o.b. Cleveland, Chicago and Gary	2.95c.
F.o.b. Buffalo	3.00c.
F.o.b. Detroit	2.95c.

* In quantities of 10,000 to 19,999 lb.

Plates

	Base per Lb.
F.o.b. Pittsburgh	2.25c.
F.o.b. Chicago or Gary	2.30c.
Del'd Cleveland	2.445c.
F.o.b. Coatesville or Spar. Pt.	2.35c.
Del'd Philadelphia	2.435c.
Del'd New York	2.54c.
F.o.b. Birmingham	2.40c.
F.o.b. cars dock Gulf ports	2.65c.
F.o.b. cars dock Pacific ports	2.80c.
Wrought iron plates, f.o.b. Pittsburgh	3.80c.

Floor Plates

F.o.b. Pittsburgh	3.50c.
F.o.b. Chicago	3.55c.
F.o.b. Coatesville	3.60c.
F.o.b. cars dock Gulf ports	3.90c.
F.o.b. cars dock Pacific ports	4.05c.

Structural Shapes

	Base per Lb.
F.o.b. Pittsburgh	2.25c.
F.o.b. Chicago	2.30c.
Del'd Cleveland	2.445c.
F.o.b. Buffalo or Bethlehem	2.35c.
Del'd Philadelphia	2.455c.
Del'd New York	2.5125c.
F.o.b. Birmingham (standard)	2.40c.
F.o.b. cars dock Gulf ports	2.65c.
F.o.b. cars dock Pacific ports	2.80c.

Steel Sheet Piling

	Base per Lb.
F.o.b. Pittsburgh	2.60c.
F.o.b. Chicago or Buffalo	2.70c.
F.o.b. cars dock Gulf or Pacific Coast ports	3.05c.

RAILS AND TRACK SUPPLIES

F.o.b. Mill

Standard rails, heavier than 60 lb., per gross ton	$42.50
Angle bars, per 100 lb.	2.80

F.o.b. Basing Points

Light rails (from billets) per gross ton	$43.00
Light rails (from rail steel) per gross ton	42.00

	Base per Lb.
Spikes	3.15c.
Tie plates, steel	2.30c.
Tie plates, Pacific Coast ports	2.40c.
Track bolts, to steam railroads	4.35c.
Track bolts, to jobbers, all sizes (per 100 counts)	65-5 per cent off list

Basing points on light rails are Pittsburgh, Chicago and Birmingham; on spikes and tie plates, Pittsburgh, Chicago, Portsmouth, Ohio, Weirton, W. Va., St. Louis, Kansas City, Minnequa, Colo., Birmingham and Pacific Coast ports; on tie plates alone, Steelton, Pa., Buffalo; on spikes alone, Youngstown, Lebanon, Pa., Richmond, Va.

SHEETS, STRIP, TIN PLATE TERNE PLATE

Sheets

Hot Rolled

	Base per Lb.
No. 10, f.o.b. Pittsburgh	2.40c.
No. 10, f.o.b. Gary	2.50c.
No. 10, del'd Detroit	2.60c.
No. 10, del'd Philadelphia	2.69c.
No. 10, f.o.b. Granite City	2.60c.
No. 10, f.o.b. Birmingham	2.55c.
No. 10, f.o.b. cars dock Pacific ports	2.95c.
No. 10 wrought iron, P'gh	4.25c.

Hot-Rolled Annealed

No. 24, f.o.b. Pittsburgh	3.15c.
No. 24, f.o.b. Gary	3.25c.
No. 24, del'd Detroit	3.35c.
No. 24, del'd Philadelphia	3.44c.
No. 24, f.o.b. Granite City	3.35c.
No. 24, f.o.b. Birmingham	3.30c.
No. 24, f.o.b. cars dock Pacific ports	3.80c.
No. 24, wrought iron, Pittsburgh	5.15c.

Heavy Cold-Rolled

No. 10 gage, f.o.b. Pittsburgh	3.10c.
No. 10 gage, f.o.b. Gary	3.20c.
No. 10 gage, f.o.b. Detroit	3.30c.
No. 10 gage, del'd Philadelphia	3.39c.
No. 10, f.o.b. Granite City	3.30c.
No. 10 gage, f.o.b. Birmingham	3.25c.
No. 10 gage, f.o.b. cars dock Pacific ports	3.70c.

Light Cold-Rolled

No. 20 gage, f.o.b. Pittsburgh	3.55c.
No. 20 gage, f.o.b. Gary	3.65c.
No. 20 gage, del'd Detroit	3.75c.
No. 20 gage, del'd Philadelphia	3.84c.
No. 20, f.o.b. Granite City	3.75c.
No. 20 gage, f.o.b. Birmingham	3.70c.
No. 20 gage, f.o.b. cars, dock Pacific ports	4.10c.

Galvanized Sheets

No. 24 gage, f.o.b. Pittsburgh	3.80c.
No. 24, f.o.b. Gary	3.90c.
No. 24, del'd Philadelphia	4.09c.
No. 24, f.o.b. Granite City	4.00c.
No. 24, f.o.b. Birmingham	3.95c.
No. 24, f.o.b. cars, dock, Pacific ports	4.40c.
No. 24, wrought iron, Pittsburgh	6.10c.

Electrical Sheets
(F.o.b. Pittsburgh)

	Base per Lb.
Field grade	3.35c.
Armature	3.70c.
Electrical	4.20c.
Special Motor	5.10c.
Special Dynamo	5.80c.
Transformer	6.30c.
Transformer Special	7.30c.
Transformer Extra Special	7.80c.

Base gage changed from 28 to 24 gage. Gage extras are the same as those applying on hot-rolled, annealed sheets with few exceptions.
Silicon Strip in coils—Sheet price plus silicon sheet extra width extras plus 25c per 100 lb. for coils.

Long Ternes

No. 24, unassorted 8-lb. coating f.o.b. Pittsburgh	4.10c.
F.o.b. Gary	4.20c.
F.o.b. cars, dock, Pacific ports	480c.

Vitreous Enameling Stock

No. 20, f.o.b. Pittsburgh	3.50c.
No. 20, f.o.b. Gary	3.60c.
No. 20, f.o.b. Granite City	3.70c.
No. 20, f.o.b. cars dock Pacific ports	4.10c.

Tin Mill Black Plate

No. 28, f.o.b. Pittsburgh, per lb.	3.30c.
No. 28, Gary	3.40c.
No. 28, f.o.b. Granite City	3.50c.
No. 28, cars dock Pacific ports, boxed	4.175c.

Tin Plate

	Base per Box
Standard cokes, f.o.b. Pittsburgh district mill	$5.35
Standard cokes, f.o.b. Gary	5.45
Standard coke, f.o.b. Granite City	5.55

Special Coated Manufacturing Ternes

	Base per Box
F.o.b. Pittsburgh	$4.65
F.o.b. Gary	4.75
F.o.b. Granite City	4.85

Roofing Terne Plate
(F.o.b. Pittsburgh)

(Per Package, 112 sheets, 20 x 28 in.)

8-lb. coating I.C.	$12.00
15-lb. coating I.C.	14.00
20-lb. coating I.C.	15.00
25-lb. coating I.C.	16.00
30-lb. coating I.C.	17.25
40-lb. coating I.C.	19.50

Hot-rolled Hoops, Bands, Strip and Flats under ¾ In.

	Base per Lb.
All widths up to 24 in., Pittsburgh	2.40c.
All widths up to 24 in., Chicago	2.50c.
All widths up to 24 in., del'd Detroit	2.60c.
All widths up to 24 in., Granite City	2.60c.
All widths up to 24 in., Birmingham	2.55c.
Cooperage stock, Pittsburgh	2.50c.
Cooperage stock, Chicago	2.60c.

Cold-Rolled Strip*

	Base per Lb.
F.o.b. Pittsburgh	3.20c.
F.o.b. Cleveland	3.20c.
Del'd Chicago	3.48c.
F.o.b. Worcester	3.40c.

* Carbon 0.25 and less.

Cold Rolled Spring Steel

		Pittsburgh and Cleveland	Worcester
Carbon	0.25-0.50%	3.20c.	3.40c.
Carbon	.51- .75	4.45c.	4.65c.
Carbon	.76-1.00	6.30c.	6.50c.
Carbon	Over 1.00	8.50c.	8.70c.

Fender Stock

No. 14, Pittsb'gh or Cleveland	3.45c.
No. 20, Pittsb'gh or Cleveland	3.85c.

WIRE PRODUCTS

(Carload lots, f.o.b. Pittsburgh and Cleveland)

To Manufacturing Trade

	Per Lb.
Bright wire	2.90c.
Galvanized wire	2.95c.
Spring wire	3.50c.

Chicago prices on products sold to the manufacturing trade are $1 a ton above Pittsburgh or Cleveland. Worcester and Duluth prices are $2 a ton above, Birmingham $3 above, and Pacific Coast prices $9 a ton above Pittsburgh or Cleveland.

To the Trade

	Base per Keg
Standard wire nails	$2.75
Smooth coated nails	$2.75
Cut nails, carloads	$3.60

	Base per 100 Lb.
Annealed fence wire	$3.15
Galvanized fence wire	3.55
Polished staples	3.45
Galvanized staples	3.70
Barbed wire, galvanized	3.40
Twisted barbless wire	3.40
Woven wire fence, base column.	.75
Single loop bale ties, base col.	.63

Chicago and Anderson, Ind., mill prices are $1 a ton over Pittsburgh base (on all products except woven wire fence, for which the Chicago price is $2 above Pittsburgh); Duluth, Minn., mill prices are $2 a ton over Pittsburgh, except for woven wire fence, which is $3 over Pittsburgh and Birmingham mill prices are $3 a ton over Pittsburgh.

On wire nails, barbed wire and staples, prices at Houston, Galveston and Corpus Christi, Tex., New Orleans, Lake Charles, La., and Mobile, Ala., are $6 a ton over Pitsburgh.

On nails, staples and barbed wire, prices of $6 a ton over Pittsburgh are also quoted at Beaumont and Orange, Tex.

STEEL AND WROUGHT IRON PIPE AND TUBING

Welded Pipe

Base Discounts, f.o.b. Pittsburgh District and Lorain, Ohio, Mills

F.o.b. Pittsburgh only on wrought iron pipe.

Butt Weld

Steel			*Wrought Iron*		
In.	Black	Galv.	In.	Black	Galv.
⅛	52	31	¼ & ⅜	+13	+35
¼ to ⅜	55	38½	½	20	1½
½	59½	49	¾	26	8
¾	62½	53	1 & 1¼	30	14
1 to 3	64½	55½	1½	34	16½
			2	33½	16

Lap Weld

2	57	47½	2	26½	10
2½ & 3	60	50½	2½ to 3½	27½	12½
3½ to 6	62	52½	4	29½	16
7 & 8	61	50½	4½ to 8	28½	15
9 & 10	60½	50	9 to 12	24½	10
11 & 12	59½	49			

Butt Weld, extra strong, plain ends

⅛	50½	36½	¼ & ⅜	+14	+48
¼ to ⅜	52½	40½	½	21	4
½	57½	48½	¾	27	10
¾	61½	52½	1 to 2	34	17½
1 to 3	63	55			

Lap Weld, extra strong, plain ends

2	55	46½	2	29½	13½
2½ & 3	59	50½	2½ to 4	35	20½
3½ to 6	62½	54	4½ to 6	33½	19
7 & 8	61½	51	7 & 8	34½	19½
9 & 10	60½	50	9 to 12	28	15½
11 & 12	59½	49			

On butt-weld and lap-weld steel pipe jobbers are granted a discount of 5%. On less-than-carload shipments prices are determined by adding 25 and 30% and the carload freight rate to the base card.

Note—Chicago district mills have a base two points less than the above discounts. Chicago delivered base is 2½ points less. Freight is figured from Pittsburgh, Lorain, Ohio, and Chicago district mills, the billing being from the point producing the lowest price to destination.

Boiler Tubes

Seamless Steel Commercial Boiler Tubes and Locomotive Tubes

(Net base prices per 100 ft. f.o.b. Pittsburgh in carload lots)

		Cold Drawn	Hot Rolled
1 in. o.d.	13 B.W.G.	$ 9.46	$ 8.41
1¼ in. o.d.	13 B.W.G.	11.21	9.96
1½ in. o.d.	13 B.W.G.	12.38	11.00
1¾ in. o.d.	13 B.W.G.	14.09	12.51
2 in. o.d.	13 B.W.G.	15.78	14.02
2¼ in. o.d.	13 B.W.G.	17.60	15.63
2¼ in. o.d.	12 B.W.G.	19.37	17.21
2½ in. o.d.	12 B.W.G.	21.22	18.85
2¾ in. o.d.	12 B.W.G.	22.49	19.98
3 in. o.d.	12 B.W.G.	23.60	20.97
4½ in. o.d.	10 B.W.G.	45.19	40.15
3½ in. o.d.	11 B.W.G.	29.79	26.47
4 in. o.d.	10 B.W.G.	36.96	32.83
5 in. o.d.	9 B.W.G.	56.71	50.38
6 in. o.d.	7 B.W.G.	87.97	77.35

Extra for less-carload quantities:

40,000 lb. or ft. or over	Base
30,000 lb. or ft. to 39,999 lb. or ft.	5%
20,000 lb. or ft. to 29,999 lb. or ft.	10%
10,000 lb. or ft. to 19,999 lb. or ft.	20%
5,000 lb. or ft. to 9,999 lb. or ft.	30%
2,000 lb. or ft. to 4,999 lb. or ft.	45%
Under 2,000 lb. or ft.	65%

CAST IRON WATER PIPE

	Per Net Ton
*6-in. and larger, del'd Chicago	$55.00
6-in. and larger, del'd New York	53.00
*6-in. and larger, Birmingham	47.00
6-in. and larger, f.o.b. dock, San Francisco or Los Angeles	56.00
F.o.b. dock, Seattle	56.00
4-in. f.o.b. dock, San Francisco or Los Angeles	59.00
F.o.b. dock, Seattle	59.00

Class "A" and gas pipe, $3 extra
4-in. pipe is $3 a ton above 6-in.

Prices for lots of less than 200 tons. For 200 tons and over, 6-in. and larger is $46, Birmingham, and $54 delivered Chicago; and 4-in. pipe, $49, Birmingham, and $58 delivered Chicago.

BOLTS, NUTS, RIVETS, SET SCREWS

Bolts and Nuts

(F.o.b. Pittsburgh, Cleveland, Birmingham or Chicago)

	Per Cent Off List
Machine and carriage bolts:	
½ in. x 6 in. and smaller	65 and 5*
Larger and longer up to 1 in.	60 and 10*
1⅛ in. and larger	60 and 5*
Lag bolts	60 and 10*
Plow bolts, Nos. 1, 2, 3 and 7	65 and 5
Hot pressed nuts, and c.p.c. and t nuts, square or hex. blank or tapped:	
½ in. and smaller	65
9/16 in. to 1 in. inclusive	60 and 5
1⅛ in. and larger	60

* Less carload lots and less than full container quantity. Less carload lots in full container quantity, an additional 10 per cent discount; carload lots and full container quantity, still another 5 per cent discount.

Semi-finished hexagon nuts, U.S.S. and S.A.E.:	
½ in. and smaller	60 and 10
9/16 in. to 1 in. inclusive	60 and 5
1⅛ in. and larger	60
Stove bolts in packages, nuts attached	70
Stove bolts in packages, with nuts separate	70 and 10
Stove bolts in bulk	80

On stove bolts freight is allowed to destination on 200 lb. and over.

Large Rivets
(½-in. and larger)

Base per 100 Lb.	
F.o.b. Pittsburgh or Cleveland	$3.60
F.o.b. Chicago or Birmingham	3.70

Small Rivets
(7/16-in. and smaller)

	Per Cent Off List
F.o.b. Pittsburgh	65 and 5
F.o.b. Cleveland	65 and 5
F.o.b. Chicago and Birmingham	65 and 5

Cap and Set Screws

(Freight allowed up to but not exceeding 65c. per 100 lb. on lots of 200 lb. or more.)

	Per Cent Off List
Milled cap screws, 1 in. dia. and smaller	50 and 10
Milled standard set screws, case hardened, 1 in. dia. and smaller	75
Milled headless set screws, cut thread ¾ in. and smaller	75
Upset hex. head cap screws U.S.S. or S.A.E. thread 1 in. and smaller	60
Upset set screws, cup and oval points	75
Milled studs	65

Alloy and Stainless Steel

Alloy Steel Blooms, Billets and Slabs

F.o.b. Pittsburgh, Chicago, Canton, Massillon, Buffalo, Bethlehem.
Base price, $60 a gross ton.

Alloy Steel Bars

F.o.b. Pittsburgh, Chicago, Buffalo, Bethlehem, Massillon or Canton.
Open-hearth grade, base ..... 3.00c.
Delivered, Detroit ..... 3.15c.

S.A.E. Series Numbers	Alloy Differential per 100 lb.
200 (¼% Nickel)	$0.35
2100 (1¼% Nickel)	0.75
2300 (3½% Nickel)	1.55
2500 (5% nickel)	$2.25
3100 Nickel-chromium	0.70
3200 Nickel-chromium	1.35
3300 Nickel-chromium	3.80
3400 Nickel-chromium	3.20
4100 Chromium-molybdenum (0.15 to 0.25 Molybdenum)	0.55
4100 Chromium-molybdenum (0.25 to 0.40 Molybdenum)	0.75
4600 Nickel - molybdenum (0.20 to 0.30 Mo, 1.50 to 2.00 Ni)	1.10
5100 Chrome steel (0.60-0.90 Cr.)	0.35
5100 Chrome steel (0.80-1.10 Cr.)	0.45
5100 Chromium spring steel	0.15
6100 Chromium-vanadium bar	1.20
6100 Chromium-vanadium spring steel	0.85
Chromium-nickel-vanadium	1.50
Carbon-vanadium	0.85

These prices are for hot-rolled steel bars. The differential for most grades in electric furnace steel is 50c. higher. Slabs with a section area of 16 in. and 2½ in. thick or over take the billet base.

Alloy Cold-Finished Bars

F.o.b. Pittsburgh, Chicago, Gary, Cleveland or Buffalo, 3.65c. base per lb. Delivered Detroit, 3.75c., carlots.

CORROSION & HEAT RESISTANT ALLOYS

(Base prices, cents per lb., f.o.b. Pittsburgh)

Chrome-Nickel

	No. 304	No. 302
Forging billets	21.25c.	20.40c.
Bars	25c.	24c.
Plates	29c.	27c.
Structural shapes	25c.	24c.
Sheets	36c.	34c.
Hot-rolled strip	23.50c.	21.50c.
Cold-rolled strip	30c.	28c.
Drawn wire	25c.	24c.

Straight Chrome

	No. 410	No. 430	No. 442	No. 446
Bars	18.50c.	19c.	22.50c.	27.50c.
Plates	21.50c.	22c.	25.50c.	30.50c.
Sheets	26.50c	29c.	32.50c.	36.50c.
Hot strip	17c.	17.50c.	23c.	28c.
Cold stp.	22c.	22.50c.	28.50c.	36.50c.

TOOL STEEL

High speed	80c.
High-carbon-chrome	43c.
Oil-hardening	24c.
Special	22c.
Extra	18c.
Regular	14c.

Prices for warehouse distribution to all points on or East of Mississippi River are 2c. a lb. higher. West of Mississippi quotations are 3c. a lb. higher.

British and Continental

BRITISH

Per Gross Ton
f.o.b. United Kingdom Ports

Ferromanganese, export	£20 Nominal
Tin plate, per base box	22s. 6d. to 23s.
Steel bars, open-hearth	£11
Beams, open-hearth	£11 2s. 6d.
Channels, open-hearth	£11 7s. 6d.
Angles, open-hearth	£11 2s. 6d.
Black sheets, No. 24 gage	£15
Galvanized sheets, No. 24 gage	£17 15s.

CONTINENTAL

Per Gross Ton, Gold £, f.o.b. Continental Ports

Billets, Thomas	£5 7s. 6d.
Wire rods, No. 5 B.W.G.	£6 10s.
Steel bars, merchant	£6
Sheet bars	£5 8s. 6d.
Plate ¼ in. and up	£7 7s.
Plate 3/16 in. and 5 mm.	£7 13s.
Sheet, ⅛ in.	£8 9s. 6d.
Beams, Thomas	£5 8s.
Angles (Basic)	£6 2s. 6d.
Hoops and strip, base	£6 10s.

IRON AND STEEL WAREHOUSE PRICES

PITTSBURGH*

Per Net Ton

Plates	3.70c.
Structural shapes	3.70c.
Soft-steel bars and small shapes	3.80c.
Reinforcing steel bars	2.75c.
Cold-finished and screw stock:	
Rounds and hexagons	4.15c.
Squares and flats	4.15c.
Hot rolled strip incl. 3/16 in. thick, under 24 in. wide	4.00c.
Hoops	4.50c.
Hot-rolled annealed sheets (No. 24), 10 or more bundles	4.50c.
Galv. sheets (No. 24), 10 or more bundles	5.15c.
Hot-rolled sheets (No. 10)	3.75c.
Galv. corrug. sheets (No. 28), per square (more than 3750 lb.)	$4.48
Spikes, large .....1 to 24 kegs	$3.75

Per Cent Off List

Track bolts, all sizes per 100 count	55
Machine bolts, 100 count	**
Carriage bolts, 100 count	**
Nuts, all styles, 100 count	**
Large rivets, base per 100 lb.	$4.35
Wire, black, soft ann'l'd, base per 100 lb.	3.45c.
Wire, galv. soft, base per 100 lb.	3.85c.
Common wire nails, per keg	3.00c.
Cement coated nails, per keg	3.00c.

On plates, structurals, bars, reinforcing bars, bands, hoops and blue annealed sheets, base applies to orders of 400 to 3999 lb.

* Delivered in Pittsburgh switching district.

** Prices on application.

CHICAGO

Base per Lb.

Plates and structural shapes	3.75c.
Soft steel bars, rounds	3.85c.
Soft steel bars, squares and hexagons	4.00c.
Cold-fin. steel bars:	
Rounds and hexagons	4.30c.
Flats and squares	4.30c.
Hot-rolled strip	4.10c.
Hot-rolled annealed sheets (No. 24)	4.60c.
Galv. sheets (No. 24)	5.25c.
Spikes (keg lots)	**$4.40**
Track bolts (keg lots)	5.05
Rivets, structural (keg lots)	**4.95
Rivets, boiler (keg lots)	**5.05

Per Cent Off List

Machine bolts and carriage bolts, ½ in. and smaller	60
Lag screws	*55 and 5
Hot-pressed nuts, sq. and hex., tap or blank, ¼ by 6 in. and smaller	60
Hex. head cap screws	60
Cut point set screws	75
Flat head bright wood screws	62 and 20
Spring cotters	45
Stove bolts in full packages	72½
Rd. hd. tank rivets, 7/16 in. and smaller	55
Wrought washers	$4.00 off list
Black ann'l'd wire per 100 lb. to mfg. trade (No. 14 and heavier)	$4.55
Com. wire nails, 15 kegs or more, per keg	$3.20
Cement c't'd nails, 15 kegs or more, per keg	$3.20

On plates, shapes, bars, hot-rolled strip and heavy hot-rolled sheets, the base applies on orders of 400 to 3999 lb. All prices are f.o.b. consumers' plants within the Chicago switching district.

* These are quotations delivered to city trade for quantities of 100 lb. or more. For lots of less than 100 lb., the quotation is 60 per cent off. Discounts applying to country trade are 70 per cent off, f.o.b. Chicago, with full or partial freight allowed up to 50c. per 100 lb.

** Base at 100 lb.

NEW YORK

Base per Lb.

Plates, ¼ in. and heavier	4.00c.
Structural shapes	3.97c.
Soft steel bars, round	4.12c.
Iron bars, Swed. charcoal	7.25 to 7.50c.
Cold-fin. shafting and screw stock:	
Rounds and hexagons	4.57c.
Flats and squares	4.57c.
Cold-rolled; strip, soft and quarter hard	3.92c.
Hoops	4.32c.
Bands	4.32c.
Hot-rolled sheets (No. 10)	4.00 to 4.07c.
Hot-rolled ann'l'd sheets (No. 24*)	4.50 to 4.82c.
Galvanized sheets (No. 24*)	5.00c.
Long terne sheets (No. 24)	5.50 to 6.20c.
Armco iron, galv. (No. 24†)	6.25c.
Toncan iron, galv. (No. 24†)	6.25c.
Galvanneal (No. 24†)	6.50c.
Armco iron, hot-rolled annealed (No. 24†)	5.65c.
Toncan iron, hot-rolled annealed (No. 24†)	5.65c.
Armco iron hot-rolled (No. 10†)	4.60c.
Toncan iron, hot-rolled (No. 10†)	4.60c.
Cold-rolled sheets (No. 20) for quantities 400 to 1499 lb.	
Standard quality	5.40c.
Deep drawing	6.05c.
Stretcher leveled	6.05c.
SAE, 2300, hot-rolled	7.82c.
SAE, 3100, hot-rolled	6.37c.
SAE, 6100, hot-rolled, annealed	10.52c.
SAE, 2300, cold-rolled	9.00c.
SAE, 3100, cold-rolled, annealed	8.55c.
Floor plate, ⅛ in. and heavier	5.60c.
Standard tool steel	12.50c.
Wire, black, annealed (No. 9)	4.25c.
Wire, galv. (No. 9)	4.60c.
Tire steel, 1 x ½ in. and larger	4.61c.
Open-hearth spring steel	4.75c. to 10.25c.
Common wire nails, base per keg	3.25c.

Per Cent Off List

Machine bolts, square head and nut: All diameters. Prices on application	
Carriage bolts, cut thread: All diameters. Prices on application	

* For 1500 lb. or more; add 0.25c. on smaller lots. No. 28 and lighter, 36 in. wide, 20c. per 100 lb. higher.

ST. LOUIS

Base per Lb.

Plates and struc. shapes	3.99c.
Bars, soft steel (rounds and flats)	4.09c.
Bars, soft steel (squares, hexagons, ovals, half ovals and half rounds)	4.24c.
Cold-fin. rounds, shafting, screw stock	4.54c.
Hot - rolled annealed sheets (No. 24)	4.84c.
Galv. sheets (No. 24*)	5.49c.
Hot-rolled sheets (No. 10)	4.09c.
Black corrug. sheets (No. 24*)	4.89c.
2 galv. corrug. sheets	5.54c.
Structural rivets	5.29c.
Boiler rivets	5.39c.

Per Cent Off List

Tank rivets, 7/16 in. and smaller	50
Machine and carriage bolts, lag screws, fitting up bolts, bolt ends, plow bolts, hot-pressed nuts, square and hexagon, nuts; all quantities	60

* No. 26 and lighter take special prices.

PHILADELPHIA

Base per Lb.

*Plates, ¼-in. and heavier	3.90c.
*Structural shapes	3.90c.
*Soft steel bars, small shapes, iron bars (except bands)	4.00c.
‡Reinforc. steel bars, sq. twisted and deformed	3.53c.
Cold-finished steel bars	4.53c.
*Steel hoops	4.35c.
*Steel bands, No. 12 and 3/16 in. incl.	4.10c.
*Spring steel	5.50c.
†Hot-rolled anneal. sheets (No. 24)	4.65c.
†Galvanized sheets (No. 24)	5.30c.
*Hot-rolled annealed sheets (No. 10)	4.00c.
*Diam. pat. floor plates, ¼ in.	5.25c.

These prices are for delivery in Philadelphia trucking area.

* Base prices subject to deduction on orders aggregating 4000 lb. or over.

† For 25 bundles or over.

‡ For less than 2000 lb.

CLEVELAND

Base per Lb.

Plates and struc. shapes	3.86c.
Soft steel bars	3.75c.
†Reinforc. steel bars	2.50c.
‡Cold-finished steel bars	4.30c.
Hot-rolled strip, 6 in. wide and under	4.16c.
Cold-finished strip	3.60c.
Hot-rolled annealed sheets (No. 24)	4.66c.
Galvanized sheets (No. 24)	5.31c.
Hot-rolled sheets (No. 10)	3.91c.
Hot-rolled 3/16 in. 24 to 48 in. wide sheets	3.91c.
Floor plates, 3/16 in. and heavier	5.76c.
*Black ann'l'd wire, per 100 lb.	$3.40
*No. 9 galv. wire, per 100 lb.	3.80
*Com. wire nails, base per keg	2.95

Per Cent Off List

Machine and carriage bolts, small	65 and 5
Large	60 and 10
Nuts, 100 count ½ in. and smaller	65 and 5
9/16 in. to 1 in.	60 and 10

† Outside delivery 10c. less.

* For 5000 lb. or less.

‡ Plus switching and carriage charges and quantity differentials up to 50c.

CINCINNATI

Base per Lb.

Plates and struc. shapes	3.95c.
Floor plates	5.55c.
Bars, rounds, flats and angles	4.05c.
Other shapes	4.20c.
Rail steel reinforc. bars	3.75
Hoops and bands, 3/16 in. and lighter	4.25c.
Cold-finished bars	4.50c.
Hot-rolled annealed sheets (No. 24) 3500 lb. or more	4.60c.
Galv. sheets (No. 24) 3500 lb. or more	$5.25
Hot-rolled sheets (No. 10)	4.00c.
Small rivets	55 per cent off list
No. 9 ann'l'd wire, per 100 lb. (1000 lb. or over)	$3.48
Com. wire nails, base per keg: Any quantity less than carload	3.20
Cement c't'd nails, base 100-lb. keg.	3.50
Chain, lin. per 100 lb.	8.35

Net per 100 Ft.

Seamless steel boiler tubes, 2-in.	$21.80
4-in.	52.45
Lap-welded steel boiler tubes. 2-in.	20-73
4-in.	48.41

BUFFALO

Base per Lb.

Plates	3.92c.
Floor plates	5.52c.
Struc. shapes	3.80c.
Soft steel bars	3.90c.
Reinforcing bars	3.10c.
Cold-fin. flats and sq.	4.35c.
Rounds and hex.	4.35c.
Cold-rolled strip steel	3.79c.
Hot-rolled annealed sheets (No. 24)	4.80c.
Heavy hot-rolled sheets (3/16 in., 24 to 48 in. wide)	3.97c.
Galv. sheet (No. 24)	5.45c.
Bands	4.22c.
Hoops	4.22c.
Heavy hot-rolled sheets	3.97c.
Com. wire nails, base per keg	$3.26
Black wire, base per 100 lb. (2500-lb. lots or under)	4.55c.
(Over 2500 lb.)	4.45c.

BOSTON

Base per Lb.

Channels, angles	4.20c.
Tees and zees, under 3 in.	4.45c.
H beams and shapes	4.07c.
Plates — Sheared, tank and univ. mill, ¼ thick and heavier	4.08c.
Floor plates, diamond pattern	5.13c.
Bar and bar shapes (mild steel)	4.20c.
Bands 3/16 in. thick and No. 12 ga. incl.	4.40 to 5.40
Half rounds, half ovals, ovals and bevels	5.45c.
Tire steel	5.45c.
Cold-rolled strip steel	3.845c.
Cold-rolled rounds, squares and hexagons	4.65c.
Cold-finished flats	4.65c.
Blue annealed sheets, No. 10 ga.	3.90c.
One pass cold-rolled sheets No. 24 ga.	4.50c.
Galvanized steel sheets, No. 24 ga.	5.05c.
Lead coated sheets, No. 24 ga.	6.15c.

Price delivered by truck in metropolitan Boston, subject to quantity differentials.

DETROIT

	Base per Lb.
Soft steel bars	3.49c.
Structural shapes	3.95c.
Plates	3.95c.
Floor plates	5.85c.
Hot-rolled annealed sheets (No. 24)*	4.69c.
Hot-rolled sheets (No. 10)	3.94c.
Galvanized sheets (No. 24)*	5.40c.
Bands and hoops	4.19c.
Cold-finished bars	4.30c.
Cold-rolled strip	3.78c.
Hot-rolled alloy steel (S.A.E. 3100 Series)	6.44c.

Quantity differential on bars, plates, structural shapes, bands, hoops, floor plates and heavy hot-rolled: Under 100 lb., 1.50c. over base; 100 to 399 lb., base plus .50c.; 400 to 3999 lb. base; 4000 to 9999 lb., base less .10c.; 10,000 lb. and over, less .15c.

*Under 400 lb., .50c. over base, 400 to 1499 lb., base; 1500 to 3499 lb., base less .10c.; 3500 lb. and over, base less .15c.

Prices delivered by truck in metropolitan Detroit, subject to quantity differentials covering shipment at one time.

Galvanized and hot-rolled annealed may not be combined to obtain quantity deductions.

MILWAUKEE

	Base per Lb.
Plates and structural shapes	3.86c.
Soft steel bars, rounds up to 8 in., flats and fillet angles	3.96c.
Soft steel bars, squares and hexagons	4.11c.
Hot-rolled strip	4.21c.
Hot-rolled annealed sheets (No. 24)	4.71c.
Galvanized sheets (No. 24)	5.36c.
Cold-finished steel bars	4.41c.
Structural rivets (keg lots)	5.16c.
Boiler rivets, cone head (keg lots)	5.26c.
Track spikes (keg lots)	4.61c.
Track bolts (keg lots)	5.81c.
Black annealed wire (No. 6 to No. 9 incl.)	4.05c.
Com. wire nails and cement coated nails 1 to 14 kegs	3.25c.

	Per Cent Off List
Machine bolts and carriage bolts, ½x6 and smaller or shorter	65
Larger and longer up to 1 in., diam.	60–5
1⅛ in. and larger	60
Coach and lag screws	60–5
Hot-pressed nuts, sq. and hex. tapped or blank, 1–199 lb.	50
200 lb. and over:	
½ in. and smaller	62½
9/16 to 1 in.	60
1⅛ in. and over	50

Prices given above are delivered Milwaukee.

On plates, shapes, bars, hot-rolled strip and heavy hot-rolled sheets, the base applies on orders of 400 to 3999 lb. On galvanized and No. 24 hot-rolled annealed sheets the prices given apply on orders of 400 to 1500 lb. On cold-finished bars the prices are for orders of 1000 lb. or more of a size.

ST. PAUL

	Base per Lb.
Mild steel bars, rounds	4.10c.
Structural shapes	4.00c.
Plates	4.00c.
Cold-finished bars	4.55c.
Hot-rolled annealed sheets, No. 24	4.85c.
Galvanized sheets, No. 24	5.50c.

On mild steel bars, shapes and plates the base applies on 400 to 14,999 lb. On hot-rolled sheets, galvanized sheets and cold-rolled sheets base applies on 15,000 lb. and over. Base on cold-finished bars is 1000 lb. and over of a size.

BIRMINGHAM

Bars and bar shapes	$3.85	base
Structural shapes and plates	3.75	"
Hot rolled sheets No. 10 ga.	3.80	"
Hot rolled sheets No. 24 ga.	4.40	" 3500 lb. and over
Galvanized sheets No. 24 ga.	5.05	" 3500 lb. or more
Strip	4.05	"
Reinforcing bars	3.85	"
Floor plates	5.96	"
Cold finished bars	4.91	"
Machine and carriage bolts	50 & 10 off list	
Rivets (structural) $4.60 base		

On plates, shapes, bars, hot rolled strip, heavy hot rolled sheets, the base applies on 400 to 3999 lb. All prices are f.o.b. consumer's plant.

BALTIMORE

	Base per Lb.
Mild steel bars and small shapes	4.00c.
Structural shapes	3.90c.
Reinforcing bars, 5 to 15 tons	3.16c.
Plates	3.90c.
Hot-rolled sheets, No. 10	3.95c.
Bands	4.20c.
Hoops	4.45c.
Special threading steel	4.15c.
Checkered floor plates ¼ in. and heavier	5.50c.
Galvanized sheets, No. 24, 100 bdls. or more	$4.70
Cold-rolled rounds, hexagons, squares and flats, 1000 lb. and more	$4.50

On plates, shapes, bars, hot-rolled strip and heavy hot-rolled sheets the base applies on orders 400 to 3999 lb. All prices are f.o.b. consumers' plants.

For second zone add 10c. per 100 lb. for trucking.

CHATTANOOGA

	Base per Lb.
Mild steel bars	4.21c.
Iron bars	4.21c.
Reinforcing bars	4.21c.
Reinforcing shapes	4.11c.
Plates	4.11c.
Hot-rolled sheets No. 10	4.16c.
Hot-rolled annealed sheets, No. 24*	4.06c.
Galvanized sheets No. 24*	4.76c.
Steel bands	4.41c.
Cold-finished bars	4.86c.

* Plus mill item extra.

MEMPHIS

	Base per Lb.
Mild steel bars	4.31c.
Shapes, bar size	4.31c.
Iron bars	4.31c.
Structural shapes	4.21c.
Plates	4.21c.
Hot-rolled sheets, No. 10	4.26c.
Hot-rolled annealed sheets, No. 24	4.91c.
Galvanized sheets, No. 24	5.66c.
Steel bands	4.56c.
Cold-drawn rounds	4.80c.
Cold-drawn flats, squares, hexagons	6.80c.
Structural rivets	5.15c.
Bolts and nuts, per cent off list	55
Small rivets, per cent off list	55

NEW ORLEANS

	Base per Lb.
Mild steel bars	4.20c.
Reinforcing bars	3.24c.
Structural shapes	4.10c.
Plates	4.10c.
Hot-rolled sheets, No. 10	4.35c.
Steel bands	4.75c.
Cold-finished steel bars	5.10c.
Structural rivets	4.85c.
Boiler rivets	4.85c.
Common wire nails, base per keg	$3.55
Bolts and nuts, per cent off list	60

PACIFIC COAST

	Base per Lb. San Francisco	Los Angeles	Seattle
Plates, tank and U. M.	4.05c.	4.30c.	4.25c.
Shapes, standard	4.05c.	4.30c.	4.25c.
Soft steel bars	4.20c.	4.30c.	4.45c.
Reinforcing bars, f.o.b. cars dock Pacific ports	2.975c.	2.975c.	3.625c.
Hot-rolled annealed sheets (No. 24)	5.15c.	5.05c.	5.35c.
Hot-rolled sheets (No. 10)	4.30c.	4.50c.	4.50c.
Galv. sheets (No. 24 and lighter)	5.85c.	5.55c.	5.90c.
Galv. sheets (No. 22 and heavier)	6.10c.	5.70c.	5.90c.
Cold-finished steel Rounds	6.80c.	6.85c.	7.10c.
Squares and hexagons	8.05c.	8.10c.	7.10c.
Flats	8.55c.	8.60c.	8.10c.
Common wire nails—base per keg less carload	$3.40	$3.40	$3.40

All items subject to differentials for quantity.

REFRACTORIES PRICES

Fire Clay Brick

	Per 1000 f.o.b. Works
First quality, Pennsylvania, Maryland, Kentucky, Missouri and Illinois	$54.00
First quality, New Jersey	56.00
Select, Ohio	49.00
Second quality, Pennsylvania, Maryland, Kentucky, Missouri and Illinois	49.00
Second quality, New Jersey	51.00
No. 1, Ohio	46.00
Ground fire clay, per ton	8.00

5 per cent trade discount on fire clay brick, except for New Jersey, quoted at net price.

Silica Brick

	Per 1000 f.o.b. Works
Pennsylvania	$54.00
Chicago District	63.00
Birmingham	54.00
Silica cement per net ton (Eastern)	9.50

5 per cent trade discount on silica brick.

Chrome Brick

	Per Net Ton
Standard f.o.b. Baltimore, Plymouth Meeting and Chester	$49.00
Chemically bonded f.o.b. Baltimore, Plymouth Meeting and Chester, Pa.	49.00

Magnesite Brick

	Per Net Ton
Standard f.o.b. Baltimore and Chester	$69.00
Chemically bonded, f.o.b. Baltimore	59.00

Grain Magnesite

	Per Net Ton
Imported, f.o.b. Baltimore and Chester, Pa. (in sacks)	$45.00
Domestic, f.o.b. Baltimore and Chester, in sacks	43.00
Domestic, f.o.b. Chewelah, Wash	25.00

RAW MATERIALS PRICES

PIG IRON

No. 2 Foundry

F.o.b. Everett, Mass.	$25.75
F.o.b. Bethlehem, Birdsboro and Swedeland, Pa., and Sparrows Point, Md.	25.00
Delivered Brooklyn	27.47
Delivered Newark or Jersey City	26.53
Delivered Philadelphia	25.76
F.o.b. Neville Island, Sharpsville and Erie, Pa.; Buffalo, Youngstown, Cleveland, Toledo and Hamilton, Ohio; Detroit; Chicago and Granite City, Ill.	24.00
F.o.b. Jackson, Ohio	25.75
Delivered Cincinnati	24.27
F.o.b. Duluth	24.50
F.o.b. Provo, Utah	22.00
Delivered San Francisco, Los Angeles or Seattle	26.50
F.o.b. Birmingham*	20.38

* Delivered prices on southern iron for shipment to northern points are 38c. a ton below delivered prices from nearest northern basing point on iron with phosphorus content of 70 and over.

Malleable

Base prices on malleable iron are 5c. a ton above No. 2 foundry quotations at Everett, Eastern Pennsylvania furnaces, Erie and Buffalo. Elsewhere they are the same.

Basic

F.o.b. Everett, Mass.	$25.25
F.o.b. Bethlehem, Birdsboro, Swedeland and Steelton, Pa., and Sparrows Point, Md.	24.50
F.o.b. Buffalo	23.00
F.o.b. Neville Island, Sharpsville and Erie, Pa.; Youngstown, Cleveland, Toledo and Hamilton, Ohio; Detroit; Chicago and Granite City, Ill.	23.50
Delivered Cincinnati	24.61
Delivered Canton, Ohio	24.89
Delivered Mansfield, Ohio	25.44
F.o.b. Jackson, Ohio	25.50
F.o.b. Birmingham	19.00

Bessemer

F.o.b. Everett, Mass.	$26.75
F.o.b. Bethlehem, Birdsboro and Swedeland, Pa.	26.00
Delivered Boston Switching District	26.50
Delivered Newark or Jersey City	27.53
Delivered Philadelphia	26.76
F.o.b. Buffalo and Erie, Pa., and Duluth	25.00
F.o.b. Neville Island and Sharpsville, Pa.; Youngstown, Cleveland, Toledo and Hamilton, Ohio; Detroit; Chicago	24.50
F.o.b. Birmingham	25.00
Delivered Cincinnati	25.61
Delivered Canton, Ohio	25.89
Delivered Mansfield, Ohio	26.44

Low Phosphorus

Basing points: Birdsboro, Pa. Steelton, Pa., and Standish, N. Y.	$28.50

Gray Forge

Valley or Pittsburgh furnace	$23.50

Charcoal

Lake Superior furnace	$27.00
Delivered Chicago	30.24

Canadian Pig Iron

Per Gross Ton

Delivered Toronto

No. 1 fdy., sil. 2.25 to 2.75	$26.50
No. 2 fdy., sil. 1.75 to 2.25	25.50
Malleable	26.00
Basic	25.50

Delivered Montreal

No. 1 fdy., sil. 2.25 to 2.75	$27.50
No. 2 fdy., sil. 1.75 to 2.25	27.00
Malleable	27.50
Basic	27.00

FERROALLOYS

Ferromanganese

F.o.b. New York, Philadelphia, Baltimore, Mobile or New Orleans.

Per Gross Ton

Domestic, 80% (carload)	$102.50

Spiegeleisen

Per Gross Ton Furnace

Domestic, 19 to 21%	$33.00
F.o.b. New Orleans	33.00

Electric Ferrosilicon

Per Gross Ton Delivered

50% (carloads)	$69.50
50% (ton lots)	77.00
75% (carloads)	126.00
75% (ton lots)	136.00

Silvery Iron

Per Gross Ton

F.o.b. Jackson, Ohio, 5.00 to 5.50%	$27.50

For each additional 0.5% silicon up to 17%, 50c. a ton is added.

The lower all-rail delivered price from Jackson or Buffalo is quoted with freight allowed. Base prices at Buffalo are $1.25 a ton higher than at Jackson.

Manganese, each unit over 2%, $1 a ton additional. Phosphorus 0.75% or over, $1 a ton additional.

Bessemer Ferrosilicon

F.o.b. Jackson, Ohio, Furnace

Per Gross Ton

10.00 to 10.50%	$33.50
10.51 to 11.00%	34.00
11.01 to 11.50%	34.50
11.51 to 12.00%	35.00
12.01 to 12.50%	35.50
12.51 to 13.00%	36.00
13.01 to 13.50%	36.50
13.51 to 14.00%	37.00
14.01 to 14.50%	37.50
14.51 to 15.00%	38.00
15.01 to 15.50%	38.50
15.51 to 16.00%	39.00
16.01 to 16.50%	39.50
16.51 to 17.00%	40.00

Manganese 2 to 3%, $1 a ton additional. For each unit of manganese over 3%, $1 a ton additional. Phosphorus 0.75% or over, $1 a ton additional.

Base prices at Buffalo are $1.25 a ton higher than at Jackson.

Other Ferroalloys

Ferrotungsten, per lb. contained W del., carloads, nominally	$1.80
Ferrotungsten, lots of 500 lbs., nominally	1.85
Ferrotungsten, smaller lots, nominally	1.90
Ferrochromium, 4 to 6% carbon and up, 65 to 70% Cr per lb. contained Cr delivered, in carloads and contract	10.50c.*
Ferrochromium, 2% carbon	16.50c. to 17.00c.*
Ferrochromium, 1% carbon	17.50c. to 18.00c.*
Ferrochromium, 0.10% carbon	19.50c. to 20.00c.*
Ferrochromium, 0.06% carbon	20.00c. to 20.50c.*
Ferrovanadium, del. per lb. contained V.	$2.70 to $2.90
Ferrocolumbium, per lb. contained columbium, f.o.b. Niagara Falls, N. Y.	$2.50*
Ferrocarbontitanium, 15 to 18% Ti, 7 to 8% C, f.o.b. furnace carload and contract per net ton	$142.50
Ferrocarbontitanium, 17 to 20% Ti, 3 to 5% C, f.o.b. furnace, carload and contract, per net ton	$157.50
Ferrophosphorus, electric, or blast furnace material, in carloads, f.o.b. Anniston, Ala., for 18%, with $3 unitage, freight equalized with Rockdale, Tenn., per gross ton	63.50
Ferrophosphorus, electric, 24% in carlots, f.o.b. Anniston, Ala., per gross ton with $3 unitage, freight equalized with Nashville, Tenn.	80.00
Ferromolybdenum, per lb. Mo. del	95c.
Calcium molybdate, per lb. Mo del	80c.
Silico spiegel, per ton, f.o.b. furnace, carloads	$45.00
Ton lots or less, per ton	50.00
Silico-manganese, gross ton, delivered.	
3%	101.50
2.50% carbon grade	106.50
2% carbon grade	111.50
1% carbon grade	121.50

* Spot prices are $5 a ton higher. Spot premium on 75 per cent ferrosilicon is $10 a ton.

ORES

Lake Superior Ores

Delivered Lower Lake Ports

Per Gross Ton

Old range, Bessemer, 51.50%	$5.25
Old range, non-Bessemer, 51.50%	5.10
Mesabi, Bessemer, 51.50%	5.10
Mesabi, non-Bessemer, 51.50%	$4.95
High phosphorus, 51.50%	4.85

Foreign Ore

C.i.f. Philadelphia or Baltimore

Per Unit

Iron, low phos., copper free, 55 to 58% dry, Algeria, nominal	17.00c.
Iron, low phos., Swedish, average, 68½% iron	Nominal
Iron, basic or foundry, Swedish, aver. 65% iron	Nominal
Iron, basic or foundry, Russian, aver. 65% iron	Nominal
Man., Caucasian, washed 52%	50c.
Man., African, Indian, 44-48%	Nominal
Man., African, Indian, 49-51%	Nominal
Man., Brazilian, 46 to 48½%	Nominal

Per Net Ton Unit

Tungsten, Chinese, wolframite, duty paid, delivered	$22.50
Tungsten, domestic, scheelite delivered	$23.50 to $25.50
Chrome ore (lump) c.i.f. Atlantic Seaboard, per gross ton:	
South African (low grade)	$16.00
Rhodesian, 45%	22.00
Rhodesian, 48%	25.50
Turkish, 48-49%	25.00 to $26.00
Turkish, 45-46%	23.00 to 23.50
Turkish, 44%	19.00 to 19.50
Chrome concentrates (Turkish) c.i.f. Atlantic Seaboard, per gross ton:	
50%	$25.50 to $26.50
48-49%	24.50 to 25.00

FLUORSPAR

Per Net Ton

Domestic, washed gravel, 85-5, f.o.b. Kentucky and Illinois mines, all rail	$20.00
Domestic, barge and rail	21.50
No. 2 lump, 85-5, f.o.b. Kentucky and Illinois mines	22.00
Foreign, 85% calcium, fluoride, not over 5% silicon, c.i.f. Atlantic ports, duty paid	24.50
Domestic No. 1 ground bulk, 95 to 98% calcium fluoride, not over 2½% silicon, f.o.b. Illinois and Kentucky mines	31.50

FUEL OIL

Per Gal.

F.o.b. Bayonne or Baltimore, No. 3 distillate	5.25c.
F.o.b. Bayonne or Baltimore, No. 4 industrial	5.25c.
Del'd Ch'go, No. 3 industrial	4.15c.
Del'd Ch'go, No. 5 industrial	4.00c.
Del'd Cleve'd, No. 3 distillate	5.875c.
Del'd Cleve'd, No. 4 industrial	5.75c.
Del'd Cleve'd, No. 5 industrial	4.625c.

COKE AND COAL

Coke *Per Net Ton*

Furnace, f.o.b. Connellsville, Prompt	$4.00 to $4.25
Foundry, f.o.b. Connellsville, Prompt	5.00 to 6.25
Foundry, by-product, Chicago ovens	10.25
Foundry, by-product, del'd New England	12.50
Foundry, by-product, del'd Newark or Jersey City	10.88 to 11.40
Foundry, by-product, Philadelphia	10.95
Foundry, by-product, delivered Cleveland	11.05
Foundry, by-product, delivered Cincinnati	10.50
Foundry, Birmingham	7.50
Foundry, by-product, del'd St. Louis industrial district	11.00 to 11.50
Foundry, from Birmingham, f.o.b. cars dock, Pacific ports	14.75

Coal *Per Net Ton*

Mine run steam coal, f.o.b. W. Pa. mines	$1.50 to $1.75
Mine run coking coal, f.o.b. W. Pa.	1.75 to 1.90
Gas coal, ¾-in. f.o.b. Pa. mines	2.00 to 2.25
Mine run gas coal, f.o.b. Pa. mines	1.80 to 2.00
Steam slack, f.o.b. W. Pa. mines	1.00 to 1.25
Gas slack, f.o.b. W. Pa. mines	1.20 to 1.45

FABRICATED STEEL

(CONTINUED FROM PAGE 100)

Pico, Cal., 190 tons, State undergrade crossing; bids Dec. 30.

Los Angeles, 100 tons, Armstrong Cork Co. plant; Lindgren & Swinerton, Los Angeles, general contractors.

Oakland, Cal., 900 tons, warehouse building, Owens-Illinois Glass Co.

Compton, Cal., 260 tons, State bridge over Compton Creek.

Livingston, Cal., 108 tons, underpass; Louis Biasotti, Stockton, Cal., general contractor.

Moxee City, Wash., 150 tons, nine bridges in connection with Yakima Canal project; Midwest Iron Works, Denver, low bidder.

Wahkiakum County, Wash., 220 tons, State highway bridge; Parker Schram, Portland, Ore., low bidder.

Coulee City, Wash., 5000 tons, 20 bulkhead gate frames and track units for inlet ends of outlet conduits from elevation 975 to elevation 1206; three bulkhead gate frames and track units for inlet ends of station-service penstocks; and 18 complete gate frames for penstock inlet gates at inlet ends of main power penstocks at Grand Coulee Dam (Spec. 764); bids Jan. 4.

Seattle, 300 tons, navy hangars.

FABRICATED PLATES

AWARDS

New York, 210 tons, water main, grade crossing elimination, Cypress Avenue, to Bethlehem Steel Co., Bethlehem, Pa.

Point Pleasant, W. Va., 445 tons, five barges, to Nashville Bridge Co., Nashville, Tenn.

St. Paul, Minn., 1110 tons, water pipe, to Taylor Forge & Pipe Works, Chicago.

Fort Peck, Mont., 500 tons, plate liners, to Treadwell Construction Co., Midland, Pa.

Tacoma, Wash., 500 tons, 36 and 48-in. pipe, to Hydraulic Equipment & Supply Co., Seattle.

NEW PROJECTS

North Scituate, Mass., 200 tons, standpipe.

SHEET PILING

AWARDS

Los Angeles, 100 tons, United States Engineer's Office, to Inland Steel Co., Chicago.

Philadelphia Rapid Transit Co. has ordered 20 streamlined street cars from St. Louis Car Co. for approximately $325,000.

RAILS AND TRACK SUPPLIES

Western Pacific has divided its purchase of approximately 22,000 tons rails and fastenings between Columbia Steel Co. and Colorado Fuel & Iron Co.

Shells Heated With Induction Equipment

ABOUT 125 guests of the Ajax Electrothermic Corp., Trenton, N. J., including some of the country's leading engineers, metallurgists and executives, attended a demonstration of the company's high frequency coreless induction furnaces at Frankford arsenal, Philadelphia, Dec. 8.

Demonstration and inspection of the arsenal was followed by a luncheon at which Dr. G. H. Clamer, president and general manager of Ajax, and Lieutenant-Colonel L. H. Campbell, in charge of ammunition production, were the principal speakers.

Two sets of induction furnaces have just been placed in operation at the arsenal. The first consists of a series of three used in conjunction with swaging operations in manufacture of large-caliber shells. The three furnaces operate simultaneously, each heating 6 in. of shell case, 16 in. long with 0.6-in. wall thickness, to a temperature of 1800 deg. F., in three minutes.

Thus the furnaces turn out one shell case per minute or 60 per hour, ready for the swaging or nose-forming operation. A previous heating process produced only 20 per hr. The induction method results in a minimum of scaling and it also was noted that the heating zone was sharply confined to the desired length. This was caused by the rapidity of heating.

The second installation comprises two induction furnaces of the same type which heat 14-in. lengths of 22-in. bar, 2⅜ in. in diameter, for a combination piercing and forging operation in the production of small-caliber shells. Three minutes are required to heat the bar to the required temperature of 2200 deg. F., hourly production being 40 units. It is expected these two furnaces will turn out each hour a total of 60 bars, 1¾-in. diameter.

The two sets of furnaces are operated from the same 150-kw., 960-cycle generator set. Full capacity of the generating equipment is required for each set of furnaces so simple switching arrangement is needed.

The Frankford installation stimulated considerable interest on the part of guests. During a luncheon discussion it was brought out that power costs and original costs of induction equipment are higher than for gas or oil-fired furnaces, but that these factors are more than offset by faster heating and resulting economies in production.

. . . Awards of 2550 tons —4750 tons in new projects.

Princeton, N. J., 140 tons, Princeton municipal improvement, stores and apartments, to Carroll-McCreary, Inc., New York.

Elizabethtown, Pa., 100 tons, hospital, to Bethlehem Steel Co.

Montgomery County, Pa., 250 tons, bridge, to Bethlehem Steel Co.

Fort Peck, Mont., 1600 tons, additional dam work, to Sheffield Steel Corp., Kansas City.

Montezuma and Dolores Counties, Colo., 144 tons, five concrete box culverts, to Colorado Builders Supply Co., Denver.

San Luis Obispo County, Cal., 207 tons, overhead crossing, to Soule Steel Co., Los Angeles.

Mendocino County, Cal., 106 tons, bridge over Jug Handle Creek, to Ceco Steel Products Corp., San Francisco.

NEW REINFORCING BAR PROJECTS

New York, 425 tons, Tallman's Island sewage treatment works.

Queens, N. Y., 313 tons, lift bridge and Northern Boulevard grade crossing elimination for Bronx-Whitestone bridge, James Stewart & Co., New York, low bidder.

Dundee, N. Y., 100 tons, school; bids taken Dec. 10.

Vestal, N. Y., 150 tons, school; O'Connell Co, Binghamton, N. Y., low bidder.

Perth Amboy, N. J., 100 tons, highway bridge.

Harrisburg, Pa., 400 tons, farm show building; bids Dec. 23.

Harrisburg, Pa., 100 tons, hospital; bids Dec. 21.

Cincinnati, 400 tons, viaduct.

Cincinnati, 119 tons, Cincinnati Chemical Co. building.

Detroit, 475 tons, Redford School.

Freeport, Ind., 260 tons, sewage treatment plant.

State of Indiana, 150 tons, including wire fabric, highway work; bids taken Dec. 14.

Springfield, Ill., 300 tons, municipal power plant extension.

Niles Center, Ill., 240 tons, school, bids taken Dec. 13.

Elgin, Ill., 150 tons, school, bids taken Dec. 15.

Livingston, Cal., 128 tons, underpass; Louis Biasotti, Stockton, Cal., general contractor.

Hickman Field, T. H., 750 tons, barracks and warehouse; bids Dec. 30.

Oahu Island, T. H., 500 tons, Kapalana flood control project.

THIS WEEK'S MACHINE . . .TOOL ACTIVITIES. . .

. . . New business continues rather light.

o o o

. . . Machinery sellers and buyers alike look to Washington for further reassurances and tax revision, before extended buying is renewed.

o o o

. . . Deliveries better on some items, although continued foreign orders maintain backlogs.

Chicago

THE bugaboo of taxes is, in the opinion of all machine tool salesmen here, the greatest single factor in the present inactivity among industrial plants. Were Congress to provide helpful legislation along that line, it is generally believed that an upswing immediately would commence. One office where sales were expected to show almost a 50 per cent increase over last year, reports that this figure, because of the recent drastic curtailment of orders has been revised downward to 20 to 25 per cent over 1936. The opportunity given most builders by this lull to catch up on back orders is the sole point to which those in the industry can point with any degree of satisfaction. Sellers of lathes, drill presses and other machines that do not usually run into large units, and that are more ready-moving tools than some others, are able to offer the best deliveries at the moment, while shipments are still delayed considerably on punch presses, planers, some types of radial drills and boring mills.

Cleveland

NEW business in machine tools continues very light, and no improvement is expected during the remainder of the year. An occasional inquiry is coming out for a single tool, but in almost every case the prospective purchaser states that he will not buy the machine before January. Excess profits taxes evidently are causing delays in purchases by some companies which wish to escape some tax burdens by paying out 1937 earnings in dividends. Most machine tool builders still have enough backlog to enable them to maintain good operations during the first few weeks of next year and have not cut down on their regular working forces, although some have eliminated a night shift.

Foreign inquiry has again become more active. A Cleveland lathe builder during the week sold four or five machines for shipment to England and received new inquiries from Belgium, France and England.

Pittsburgh

INQUIRIES have shown a slight improvement for the first time in several weeks. Orders on the other hand continue only fair, and there is doubt that total December business will measure up to November volume. There is some evidence that more attention is being given to replacement of obsolete machinery, whereas there is an inclination to postpone new development projects.

New York

NEW business is spotty and limited to a few sources. Orders have fallen off sharply for some dealers, while others report a fair volume of sales. Press brakes and shears are active lines. Stair tread, fireproof door and electric switchbox fabricators are among the buyers of such equipment. Inquiry is still active, and a substantial number of unshipped orders will be carried over into 1938. General machine shop lines are much slower, and many factory executives are looking to Washington for the next move before committing themselves on additional machinery. The Erie Railroad has purchased a large radial drill, with 12-ft. arm and 26-in. column, for its Hornell, N. Y., shops, an item that had been inquired for last August.

Both the Russians and the Japanese are still active buyers of American machine tools.

Cincinnati

WERE it not for foreign ordering, the district machinery market would be generally quiet, since domestic interest appears to have waned perceptibly. While the exact nature and extent of foreign business is kept confidential, sufficient information is released to indicate that several orders for multiple units, one up to seven machines, have been placed in this district. Standard milling machines and grinders attracted leading attention from buying interests the past week, but lathes and other lighter tools were also active. While domestic business is not totally absent from the market, the volume seems to be easing off each week and, when contrasted with the briskness of the first half, appears to be definitely quiet. There is no lack of interest by way of inquiry, however. All manufacturers report a steady, though not brisk, flow of requests for quotations. In fact, outstanding quotations are assuming large proportions and, if only a percentage result in orders, an uptrend of sizable proportions may take place. Purchase of heavy machinery continues within conservative limits, but sufficient to retain optimistic feeling among manufacturers.

Plant operations have not been diminished within the past week, since most manufacturers are still carrying good backlogs. The earliest date for reaching a position abreast of orders is Jan. 1, but many plants indicate orders are heavy enough to maintain present schedules well into the first quarter.

Philadelphia

A SCATTERED amount of export activity is counterbalanced by complete disinterest on the part of domestic mills. The result is a spotty market with not enough test business to justify any change in the price structure. An odd-lot of No. 1 cast has been placed with a nearby foundry at $17, and there has been a noticeably better inquiry for all types of foundry material. Blast furnace grades also show a little more strength on the basis of a recent $8.75 order. The undertone of the entire market is more healthy than it has been for weeks. Practically every seller is holding tight to supplies until after the first of the year, and if mill business at that time shows the slightest improvement there seems little doubt but what better quotations will rule throughout the entire list.

THEY TOOK THE SPARK LEVER OFF YOUR CAR— Why?

Because it was bothersome—confusing—not properly used by most drivers. Now the varying demands for speed and power are answered with automatic regulation of spark to gas intake. It is simpler, more efficient. You need no longer worry about spark advance and retard—it's done for you at the factory.

We Simplified Welding the Same Way

SMOOTHARC WELDERS

SINGLE CURRENT CONTROL
with automatic
VOLT-AMPERE REGULATION

On these modern welders you'll find relief from the usual complications of numerous dials, adjustments, etc. There's but one simple adjustment that gives you an unlimited number of current settings. The patented Smootharc generator automatically regulates open-circuit and arc voltage properly to give you whatever welding heat you desire. Smootharc welders use no corrective devices such as external resistors, reactors or separate stabilizers. They are not needed, because through its patented design this true welding generator uses arc impulses to speed up flux changes—cuts down current variations, makes welding faster, easier — and greatly reduces the chances for weld failures.

The complete Smootharc line includes all sizes and types of welders from 75 to 600 ampere capacity; portable and stationary models; electric motor or gas engine driven. They're fully described in a new Bulletin, "The Arc Welding of Tomorrow." Use the coupon to get your copy.

TRY THIS NEW SMOOTHARC "PF" FOR POOR-FIT WELDING ON MILD STEEL

A heavily coated electrode for use on poor-fit or irregular joints. Can also be used for overhead welding. Develops a tensile strength of 75,000 to 85,000 lbs. per square inch, 20% elongation in 2" and a resistance to impact of 30 to 50 lbs. (Izod). In sizes from 5/32" to 3/16". Test samples of "PF" or any other Smootharc Electrodes will be sent free. Use the coupon.

Harnischfeger Corporation
4401 West National Avenue
Milwaukee, Wisconsin

Please send material on Smootharc Welders and Welding Electrodes as checked below:

- ☐ Send Bulletin W-10 "The Arc Welding of Tomorrow"
- ☐ Send literature on Smootharc Welding Electrodes
- ☐ Send samples of Smootharc "PF" Welding Electrodes for test purposes, size ( )

Name..... *Title*.....

Company .....

Address .....

City..... *State*.....

HARNISCHFEGER CORPORATION

G WELDERS • EXCAVATORS • ELECTRIC CRANES P&H MOTORS • HOISTS • WELDING ELECTRODES

PLANT EXPANSION AND EQUIPMENT BUYING

NORTH ATLANTIC

Continental Can Co., 100 East Forty-second Street, New York, has purchased property at South Ashland Avenue and Thirty-seventh Street, Chicago, improved with one-story industrial building, 100 x 400 ft., for consideration of $100,000. Property is located within a block of company plant on Ashland Avenue, and will be remodeled primarily for production of can-making machinery and parts.

Socony-Vacuum Oil Co., Inc., 26 Broadway, New York, has let general contract to Bernard C. Wagner, 4485 Olive Street, St. Louis, for new bulk oil storage and distributing plant for Lubrite Division at Zepp and Potomac Streets, St. Louis, consisting of main two-story building, 150 x 183 ft., steel storage tanks and other facilities, with motor truck service and garage unit, 70 x 174 ft. Cost over $125,000 with equipment. Preston J. Bradshaw, Inc., 718 Locust Street, is architect, and John D. Falvey, 316 North Eighth Street, mechanical engineer, both St. Louis. Branch office of company is at 4140 Lindell Boulevard, St. Louis.

Signal Corps Procurement District, Army Base, Fifty-eighth Street and First Avenue, Brooklyn, asks bids until Dec. 24 for 770,000 ft. of wire, 57,500 ft. of cable and 23 reels (Circular 79).

American Metal Spinning & Stamping Co., Inc., 159 Leonard Street, New York, manufacturer of metal specialties, has leased space in building at 393 Lafayette Street and 21 East Fourth Street, for plant.

Western Printing & Lithographing Co., Poughkeepsie, N. Y., has let contract to Hudson Valley Builders' Structural Steel Co., 178 Cottage Street, for structural steel for power house at plant. Cost about $45,000 with equipment. Main offices of company are at Racine, Wis.

Consolidated Edison Co. of New York, Inc., 4 Irving Place, New York, plans expansion and improvements in generating stations, including new generating machinery and auxiliary equipment. Cost about $10,000,000. Company also will make extensions and improvements in electric distributing lines and facilities, including power substations and other structures. Cost close to $3,000,000. A bond issue of $30,000,000 is being arranged, from which fund noted will be secured.

Ford Motor Co., 1170 Broadway, New York, has leased six-story building at 1184-86 Broadway, 116 x 164 ft., about 100,000 sq. ft. of floor space, a large part of which will be used for a new service and repair branch for Ford and Lincoln automobiles.

Canada Dry Ginger Ale, Inc., 100 East Forty-scond Street, New York, has let general contract to P. O'Brien Montgomery, 913 South Akard Street, Dallas, Tex., for one-story mechanical-bottling plant, 160 x 260 ft., at Maple and Moxley Streets, Dallas. Cost about $250,000 with machinery. Contractor is also engineer for structure.

General Metal Mfg. Co., 183 Broome Street, Newark, N. J., metalware products, has leased with option to purchase a three-story building at 203-5 Johnson Avenue for new plant, removing present works to new location and increasing capacity.

American Oxygen Service Corp., 600 Essex Street, Harrison, N. J., industrial oxygen apparatus, has let general contract to Mahony-Troast Construction Co., 657 Main Avenue, Passaic, N. J., for two-story addition, 100 x 110 ft. Cost over $100,000 with equipment.

Colgate-Palmolive-Peet Co., 105 Hudson Street, Jersey City, N. J., manufacturer of soaps, powders, etc., has asked bids on general contract for two-story and basement addition, 80 x 110 ft., to branch plant at Toronto, Ont., operated in name of Colgate-Palmolive-Peet, Ltd. Cost about $85,000 with equipment.

Graflin S. Prather, 401 North Broad Street, Philadelphia, manufacturer of motor truck equipment, has leased an industrial building at Blabon and Ruffner Streets for new plant.

Midland Truck, Caster & Wheel Co., Irvington, N. J., recently organized, has leased a building at 1109 Montgomery Avenue for manufacture of industrial trucks, and will also deal in material handling equipment, parts and wheels. W. A. Hutchinson and J. U. Dion are proprietors.

Cohoes Rolling Mill Co., Cohoes, N. Y., has begun construction of a new galvanizing plant, 100 x 140 ft., with 40-ft. wing, adjoining present shop.

NEW ENGLAND

Draper Corp., Hopedale, Mass., textile mill machinery and parts, has let general contract to Bathelt Construction Co., Holyoke, Mass., for one-story addition, 35 x 200 ft. Cost close to $60,000 with equipment.

Stator Corp., Plainfield, Conn., recently organized by Joseph J. Bodell, head of Bodell & Co., Providence, R. I., investment securities, and associates, has acquired former plant of Lawton Mills at Plainfield, totaling about 350,000 sq. ft. of floor space. New owner will remodel for production of a new mechanical household appliance furnishing refrigeration and hot water, operating under a new principle. Mr. Bodell is president of company.

Holyoke Provision Co., 113 Hampden Street, Holyoke, Mass., has let general contract to J. F. Cunniff Co., 56 Suffolk Street, for three-story and basement bulk storage and distributing building, 50 x 102 ft. Cost about $80,000 with equipment.

City Council, Peabody, Mass., plans extensions and improvements in municipal electric power plant, including additional equipment. Cost about $50,000. Arthur L. Nelson Engineers, 31 St. James Avenue, Boston, are consulting engineers.

A. C. Gilbert Co., Blatchley Avenue, New Haven, Conn., manufacturer of electric motors, fans, heaters and kindred products, has asked bids on general contract for three-story and basement addition, 53 x 160 ft. Cost over $100,000 with equipment. Westcott & Mapes, New Haven, are architects and engineers.

MIDDLE WEST

International Harvester Co., 606 South Michigan Avenue, Chicago, has filed plans for one-story addition to plant at 2600 West Thirty-first Boulevard, totaling 240,000 sq. ft. floor space and making total floor area close to 1,400,000 sq. ft. New unit will be used for production of Trac-TracTors, new type of crawler tractors, including parts production and assembling department. Tractors will be diesel engine-driven, engine units to be furnished by company branch plant at Milwaukee. Cost about $1,000,000 with equipment.

Consumers Tire & Supply Co., 1146 West Roosevelt Boulevard, Chicago, automobile tires and other automotive equipment, has let general contract to All-Building Construction Co., 205 West Central Avenue, for two-story addition, 110 x 125 ft. Cost close to $85,000 with equipment. Eisenberg & Co., 14 West Washington Street, are architects.

United Artichoke Co., Gering, Neb., A. F. Meyers, secretary, has arranged for stock issue of $87,000, majority of proceeds to be used for purchase of processing machinery for new plant. Equipment will be purchased early next year.

Denver, Rio Grande & Western Railroad Co., Denver, Colo., has approved plans for addition to steam power house at Pueblo, Colo., to include new boiler units and auxiliary equipment. Cost about $35,000.

Lavelle Rubber Co., 320 West Illinois Street, Chicago, manufacturer of general rubber goods, has filed plans for new two-story and basement plant, for which general contract recently was let to J. E. Olson, 2305 Berwyn Avenue. Cost close to $50,000 with equipment. M. A. Nelson, 4633 Hermitage Avenue, is architect.

Peru Wheel Co., Peru, Ill., manufacturer of automobile wheels and kindred equipment, has acquired a one-story industrial plant at Galesburg, Ill., and will remodel for branch works for production of a small type, high-powered tractor, including assembling division.

Milwaukee Metal Spinning Co., has moved into newly erected quarters at 1325 S. 43rd Street, Milwaukee, and has started construction of a plant addition, increasing floor space to 10,000 sq. ft.

WASHINGTON DIST.

Bureau of Yards and Docks, Navy Department, Washington, asks bids (no closing date stated) for 5000 cu. ft. per min. motor-driven air compressors for Philadelphia Navy Yard (Specifications 8633).

S. C. Foster, Richmond, Va., consulting engineer, representing M. E. Marcus interests, has plans for new hydroelectric generating plant near Maggie, Va., for power supply for electrical distributing system of Craig-Boutetourt Electric Co-Operative, Inc., Maggie, with which contract has been made. Cost close to $100,000 with transmission line.

Board of District Commissioners, District Building, Washington, asks bids until Dec. 21 on general contract for three-story Dennison vocational school at 1300 Allison Street, N.W. Cost about $320,000 with equipment. Nathan C. Wyeth, address noted, is municipal architect.

Winchester Woolen Co., Winchester, Va., has plans for new steam power house. Cost about $35,000 with boilers, pumps and other equipment.

General Purchasing Officer, Panama Canal, Washington, asks bids until Dec. 21 for spraying machine, phosphor-bronze wire, drill rods, iron fencing and other equipment (Schedule 3307).

Board of Education, Norfolk, Va., plans manual training department in new two-story Ocean View school, for which bids will be asked on general contract in January. Cost about $200,000. Ferguson, Meakin & Moore, New Monroe Building, are architects.

Hampton Roads Sewage District Commission, Norfolk, Va., plans installation of power stations, motor-driven pumping machinery and accessories, screening equipment and other mechanical equipment in eight sewage disposal plants to be installed in district in 1938. A fund of $10,000,000 is proposed for project.

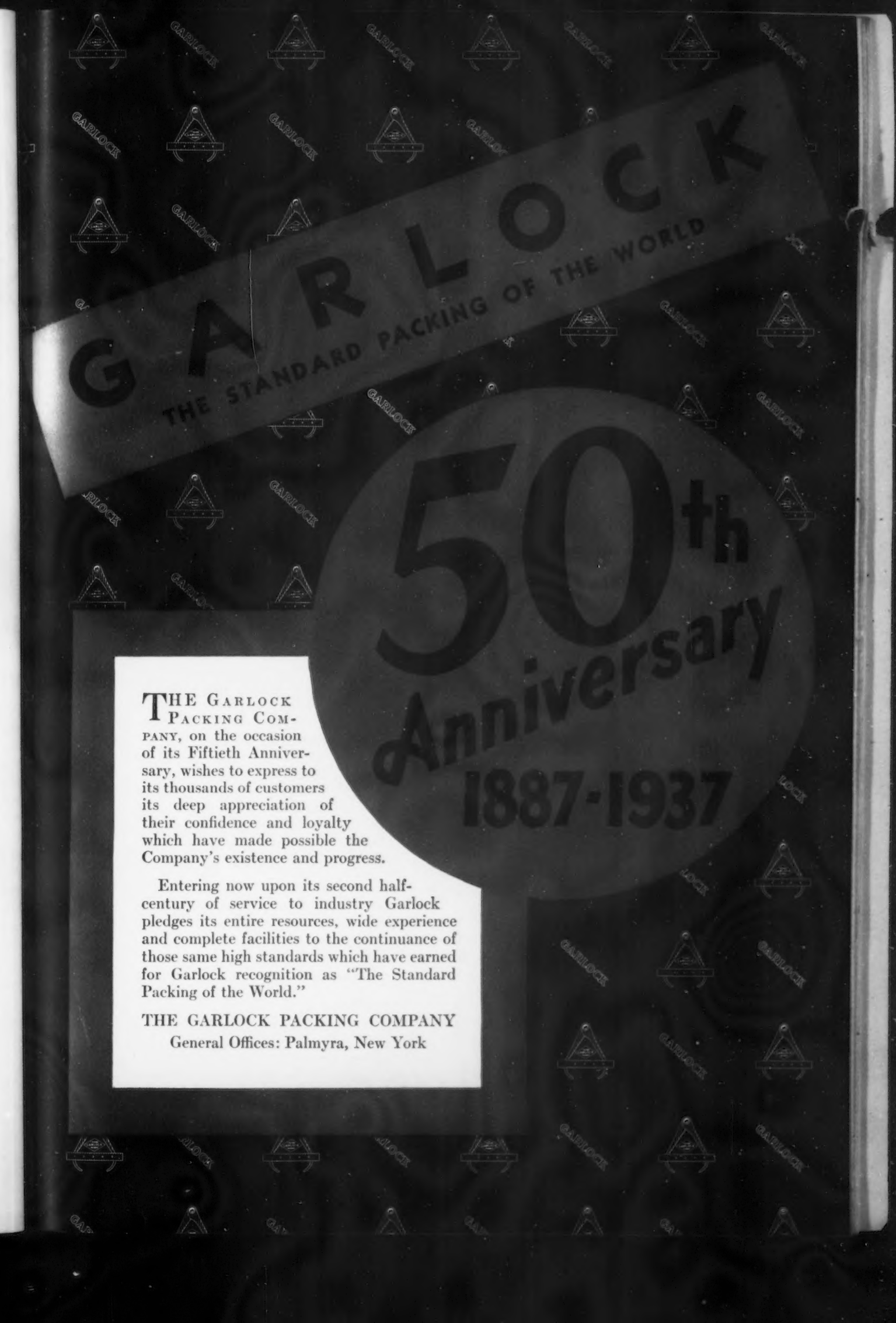
Montgomery County Board of Education, Rockville, Md., plans manual training department in new two-story junior high school at Kensington, Md., for which general contract has been let to Martin Brothers, 1341 Connecticut Avenue, Washington. Cost about $125,000. Rhees E. Burkett, 726 Jackson place, Washington, is architect.

Parkersburg Rig & Reel Co., Parkersburg, W. Va., will build a factory addition, 121 x 180 ft., costing $39,500. Plate Construction Co. is contractor.

SOUTH ATLANTIC

Oil Sales Co., Burlington, N. C., a subsidiary of American Oil Co., American

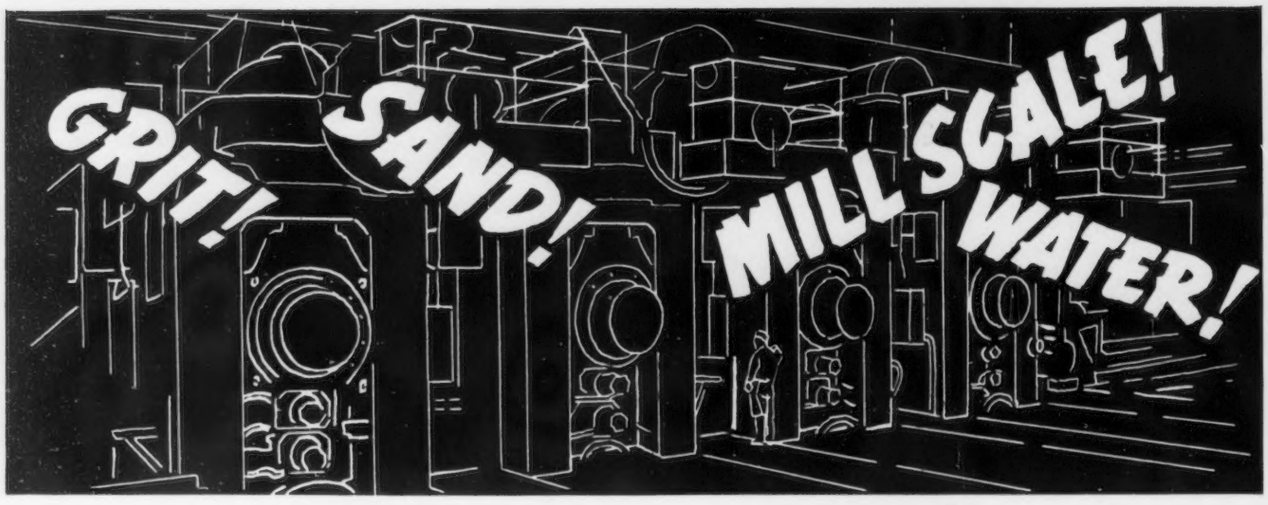
(CONTINUED ON PAGE 120)



THE GARLOCK PACKING COMPANY, on the occasion of its Fiftieth Anniversary, wishes to express to its thousands of customers its deep appreciation of their confidence and loyalty which have made possible the Company's existence and progress.

Entering now upon its second half-century of service to industry Garlock pledges its entire resources, wide experience and complete facilities to the continuance of those same high standards which have earned for Garlock recognition as "The Standard Packing of the World."

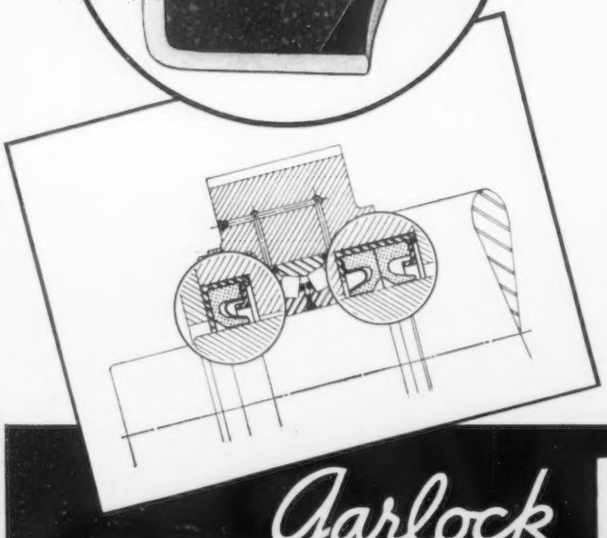
THE GARLOCK PACKING COMPANY
General Offices: Palmyra, New York



Here's an OIL SEAL that Stands It!

PATENTED

Below: Application of GARLOCK KLOZURES to Steel Mill Back-Up and Work Rolls.



GRIT ... sand ... mill scale ... water ... heat ... grease and oil—that's what an oil seal encounters on Roll Neck bearings in the steel mills. What grueling service! Yet, GARLOCK KLOZURES *stand up* under these severe conditions and give efficient, uniform performance day in and day out. In hundreds of other industries, too, these superior Oil Seals are establishing remarkable performance records. The sealing element is dense, grainless, tough, resilient—resists dirt, oil, heat and wear. Complete range of sizes. Write for catalog!

THE GARLOCK PACKING COMPANY
PALMYRA, NEW YORK

In Canada: The Garlock Packing Company of Canada, Limited, Montreal, Que.

Garlock KLOZURE

PRINTED IN U. S. A.

Odd Job Man

Most versatile of the Baker line, Baker Crane Trucks are daily saving time and money in the many odd jobs of handling steel. Change of lifting equipment only, from hook, as illustrated, to magnet, tongs, chain sling, rack or any special device permits the same crane to handle a wide variety of materials. You'll find its usefulness practically unlimited, its daily savings an important factor in cutting plant operation costs. • Get all the facts on handling costs from the Baker Materials Handling Engineer. You'll find his data on time and cost savings detailed and accurate, his suggestions practical and helpful, in solving your own handling problems. There's no obligation, just write to BAKER INDUSTRIAL TRUCK DIVISION, *of the Baker Raulang Company,* 2175 West 25th St., Cleveland, Ohio.

OLDEST MANUFACTURER
Baker
TRADE-MARK REG. U. S. PAT. OFF.
OF ELECTRIC VEHICLES

POWER INDUSTRIAL TRUCKS FOR EVERY PURPOSE

(CONTINUED FROM PAGE 116)

Building, Baltimore, plans new bulk oil storage and distributing plant near city limits, with initial steel tank capacity of about 60,000 gal. Cost close to $50,000 with equipment.

Warwick Chemical Co., West Warwick, R. I., industrial and textile chemicals, has taken over former two-story plant of Highland Park Mfg. Co., Rock Hill, S. C., and will remodel for new branch plant.

SOUTH CENTRAL

Board of Lewis County Commissioners, Vanceburg, Ky., will ask bids soon for new electric light and power plant for County buildings and other service. Bond issue of $148,000 has been authorized.

Andrew Moresi, Opelousas, La., has plans for one-story mechanical-bottling plant, 30 x 120 ft. Cost over $50,000 with equipment.

United States Engineer Office, Vicksburg, Miss., asks bids until Dec. 23 for two heat exchangers (Circular 116).

Union High Density Compress Co., Union, Miss., has let general contract to Samuel Hays, Union, for one-story addition to cotton compressing plant, 200 x 300 ft. Cost over $45,000 with compresses and other equipment. G. M. Brown is president.

Alabama Power Co., Birmingham, is arranging an appropriation of about $4,250,000 for expansion and improvements in electric generating plants and system in 1938, including equipment, transmission and distributing lines, power substations and switching stations, and other structures.

School Board, Springfield, Tenn., plans manual training equipment in new two-story high school, for which bids have been asked on general contract. Cost about $218,000. Financing has been arranged through Federal aid. Hart & Russell, Hitchcock Building, Nashville, Tenn., are architects.

OHIO AND INDIANA

Brown Lamp Co., Marion Road, Columbus, Ohio, manufacturer of electric lighting equipment, has let general contract to C. A. Carlson, 471 East Broad Street, for two-story addition, 35 x 50 ft., and improvements in present plant. Cost close to $65,000 with equipment.

Milburn Machinery Co., 1057 Goodale Boulevard, Columbus, Ohio, machinery and parts, is considering one-story addition. Cost close to $40,000 with equipment.

Board of Education of Plainville School District, Mariemont, Ohio, plans manual training equipment in new two-story high school at Wooster Pike and West Street, for which bids have been asked on general contract. Cost about $250,000. E. C. and G. T. Landberg, 114 Garfield Place, are architects, and O. W. Motz, Paramount Building, mechanical engineer, both Cincinnati.

Medusa Portland Cement Co., Midland Building, Cleveland, plans new branch mill at Paris, Ont., one-story, with storage and distributing facilities. Cost close to $175,000 with equipment.

Ohio Edison Co., Springfield, Ohio, is arranging appropriation of $4,800,000 for expansion and improvements in plants and system, including additional generating machinery and auxiliary equipment, transmission and distributing lines, power substations and switching stations, and other structures.

Contracting Officer, Aircraft Radio Laboratory, Wright Field, Dayton, Ohio, asks bids until Dec. 20 for jack screws, boring tools, drills, reamers, file cleaners, tool holders, scraper, parallels and other tools (Circular ARL-7).

Milton-Union Vested School District, Milton Township, Miami County, Ohio, plans manual training department in new two-story central high school, for which bids will be asked soon on general contract. Cost about $245,000. Financing has been arranged through Federal aid. J. C. Grunkemeyer and C. W. Sullivan, 3717 Eastern Avenue, Cincinnati, are architects.

Board of School Trustees, Richmond, Ind., plans manual training department in new two and three-story senior high school on White Water Boulevard, for which bids will be asked soon on general contract, to close early in January; steam power house also will be built. Cost about $572,000. John L. Hamilton, Tower Court, Chicago, is architect.

WESTERN PA. DIST.

Hygrade Sylvania Corp., Emporium, Pa., manufacturer of electric lamps, radio tubes and kindred products, has plans for two-story and basement addition, 60 x 120 ft. Cost over $75,000 with equipment. Company headquarters are at Salem, Mass.

Pure Oil Co., 35 East Wacker Drive, Chicago, plans extensions and improvements in branch oil refinery at Cabin Creek Junction, W. Va., with installation of new tube still, topping and cracking unit for gasoline division and other equipment. Cost close to $1,000,000 with machinery.

Board of Education, Sharon, Pa., plans manual training department in new one, two and three-story high school in Farrell district, for which bids have been asked on general contract. Cost about $500,000. Clepper & Clepper, Boyle Building, Sharon, are architects.

BUFFALO DISTRICT

Dolomite Marine Corp., 183 Main Street East, Rochester, N. Y., affiliated with Dolomite Products Co., same address, manufacturer of crushed dolomite, gypsum and kindred raw materials, has plans for one-story addition, about 40 x 800 ft. Cost over $60,000 with equipment.

Michigan Limestone & Chemical Co., foot of Katherine Street, Buffalo, has filed plans for one-story addition to pulverizing plant, for which general contract has been let to John W. Cowper Co., Inc., Sidway Building. Cost close to $30,000 with equipment.

Central School District, Cuba, N. Y., care of Bley & Lyman, 505 Delaware Avenue, Buffalo, architects, plans manual training department in new three-story central school. Cost about $500,000. Financing is being arranged. Thomas H. McKaig, 505 Delaware Avenue, Buffalo, is consulting engineer.

SOUTHWEST

Barnsdall Refining Corp., Tulsa, Okla., plans new oil refinery at Corpus Christi, Tex., comprising one and multi-story units to handle initial capacity of about 5500-bbl. of crude oil per day. Divisions will be installed for production of bunker fuel oil and gasoline, with steel tank storage and distributing facilities, pumping station, power house, machine shop and other structures. Work will begin before close of month. Cost about $2,500,000 with equipment.

Board of Public Works, Chillicothe, Mo., will take bids soon for extensions and improvements in municipal electric power plant, including new turbo-generator unit and accessories, boilers and other equipment. Cost about $300,000. Henrici-Lowry Engineering Co., West Tenth Street Building, Kansas City, Mo., is consulting engineer.

Ralston Purina Co., 835 South Eighth Street, St. Louis, cereal products, has let general contract to Duranceau & Duranceau, 5847 Hamilton Street, Montreal, for one and multi-story mill at Ville LaSalle, Que., for Canadian branch plant, to be operated in name of Ralston Purina Co., Ltd., Woodstock, Ont. Cost about $200,000 with equipment. Archibald & Illsley, 1440 St. Catherine Street West, Montreal, are architects.

Republic Oil Refining Co., Texas City, Tex., has plans for expansion and improvements in oil refinery, including equipment for increased output in gasoline and other divisions. Work will include three new steel tanks with gross capacity of 150,000 bbl., pumping machinery and other facilities. Cost over $400,000 with equipment.

Roegelein Packing Co., 1701 South Brazos Street, San Antonio, Tex., meat packer, asks bids on general contract until Dec. 20 for one-story addition. Cost about $75,000 with equipment. H. Peter Henschien, 59 East Van Buren Street, Chicago, is architect and engineer; W. E. Simpson Co., Milam Building, San Antonio, is consulting engineer.

State Building Commission, Jefferson City, Mo., will call for bids between Dec. 15 and Jan. 1 for power plant improvements at State Penitentiary. Project includes alterations to present boiler plant and erection of new turbine building, electric distribution, transformer station, power and water piping, remodeling old steam distribution lines, etc. Cost about $450,000.

MICHIGAN DISTRICT

Plymouth Motor Corp., 10060 Mount Elliott Avenue, Detroit, has plans for one-story addition, 80 x 256 ft., for storage and distribution. Cost close to $100,000 with equipment.

Briggs Mfg. Co., 11631 Mack Avenue, Detroit, automobile bodies, plumbing equipment, etc., has let general contract to W. E. Wood Co., 4649 Humboldt Avenue, for two-story power house at new plant unit in course of construction on Eight-Mile Road. Cost close to $70,000 with boiler units and other equipment.

Health City Brewing Co., Inc., Mount Clemens, Mich., recently organized with capital of $265,000, has acquired former plant of Mount Clemens Brewing Co. and will modernize for new plant. A mechanical-bottling department will be installed. Cost over $85,000 with equipment.

Consumers Power Co., Jackson, Mich., is arranging an appropriation of about $17,700,000 for expansion and improvements in plants and system to include new generating machinery and auxiliary equipment, completion of power plant now under way, transmission and distributing lines, with additions to rural electric system, power substations, switching stations and other structures.

PACIFIC COAST

Braun Corp., 2260 East Fifteenth Street, Los Angeles, manufacturer of chemical apparatus, industrial chemicals, etc., has let general contract to Stanton-Reed Co., Architects' Building, for one-story addition, 120 x 146 ft. Cost over $75,000 with equipment. Hibbard, Gerity & Kerton, Architects' Building, are architects.

Campbell Union High School District, Campbell, Cal., will install manual training shop in first unit of new two-story high school, to be located in a separate one-story structure, for which bids have been asked on general contract. Cost $240,000. Harold H. Weeks, 593 Market Street, San Francisco, is architect.

Rheem Mfg. Co., 4361 Firestone Boulevard, South Gate, Los Angeles, manufacturer of steel tanks, drums and kindred products, has let general contract to Lindgren & Swinerton, 605 Olympic Boulevard, Los Angeles, for one-story addition, 40 x 210 ft. Cost close to $50,000 with equipment.

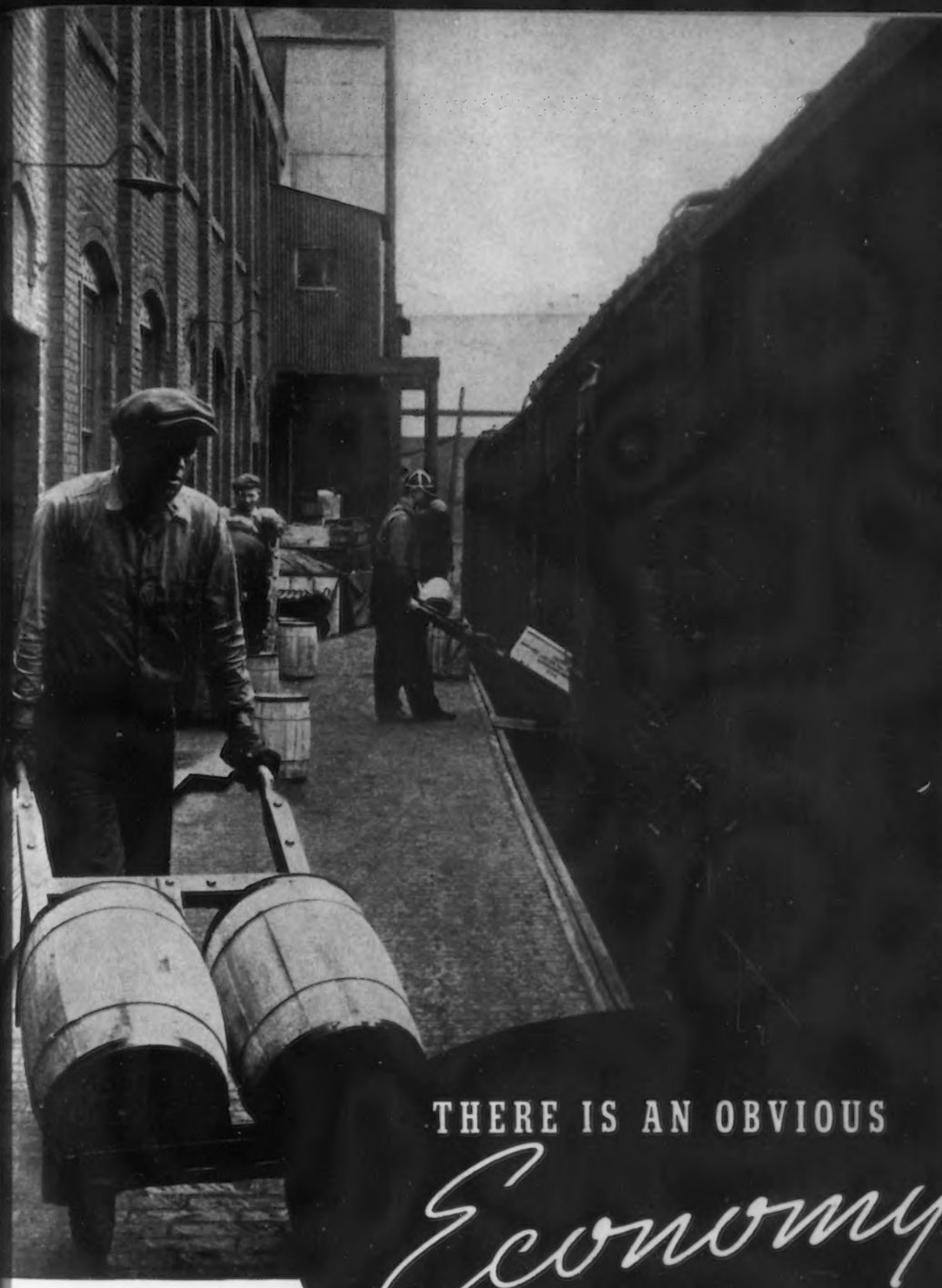
Escondido Orange Association, Escondido, Cal., has asked bids on general contract for two-story and basement precooling unit, 60 x 100 ft., to fruit-packing plant. Another one-story L-shaped addition will be built, 30 x 150 ft. Cost over $100,000 with machinery.

Northwestern Natural Gas Corp., Toppenish, Wash., plans installation of a butane gas plant for municipal service, supplementing natural gas distribution now being carried out. Cost about $30,000 with tanks and other equipment.

Buffalo-Idaho Mining Co., Golden, Idaho, has arranged for stock issue to total about $170,000, considerable portion of proceeds to be used for development of mining properties and purchase of additional machinery.

State Board of Education, Salt Lake City, Utah, plans one-story vocational shop, 100 x 166 ft., at new two-story junior college at Price, Utah, for which bids will be asked soon on general contract. Entire project will cost $273,800 including equipment. Financing has been arranged through Federal aid. Cannon & Fetzer, Salt Lake City, are architects.

Western Bottling Co., 804 East Sprague Street, Spokane, Wash., has asked bids on general contract for one-story and basement addition, 100 x 150 ft., to mechanical-bottling works. Cost about $60,000 with equipment. Arthur W. Cowley, Wellington Apartments, is architect.



BOLTS . . . Machine, Carriage, Lag, Plow, Step, Elevator, Ribbed carriage, Track, Wheel, Tire, Battery, Boiler, Cabinet, Hanger, Sheathing, Spring Center, Clip, Heel, Hub, Rim, T-Head, Oven, Starter, U-Bolts.

NUTS . . . Semi-Finished, Cold-Punched, Hot-Pressed, Slotted, Castle, Stove Bolt, Machine Screw, Mica, Tri-Castle.

RODS . . . Carriage Head, Furnace, Radiator, Spreader, Stove, Grass.

SCREWS . . . Cap, Machine, Set, Skein, Hanger, Lag.

OTHER PRODUCTS . . . Hinge Pins, Clevis Pins, Cotters, Pipe Plugs, Tinner's Rivets, Rope Clips, Studs, Dardelet Threaded Products, Rivet Bolts.

SPECIALS . . . Parts of special material or special design, made in production quantities, to your specifications.

MATERIALS . . . Stainless Steels, Heat and Corrosion Resisting Alloys, Aluminum Alloys, Brasses and Bronzes, Plain carbon and low Alloy Steels, Invar and Monel Metal, Special Steels sold under their own trade names.

THERE IS AN OBVIOUS *Economy* IN COMBINING SHIPMENTS

★ ★ ★ ★ ★ ★

YOU can buy all of your fastenings from this one dependable source . . . on one bill of lading . . . on one invoice . . . with less inside handling, less confusion, less bookkeeping, lower shipping costs . . . an obvious economy of time, effort and expense. LAMSON & SESSIONS is the manufacturer of the most complete line of bolt and nut products in this country, and requires five plants to serve our customers. Complete heat treating and plating departments are operated, and an engineering staff works with customers' engineers in the development of fastenings for special purposes. Each factory maintains huge warehouse stocks—stocks which are replenished daily so that our products stored for shipment are always new and clean. Check over your fastening requirements now and see if you cannot save time, money and effort by combining your purchases. Regardless of the type of fastening, there is but one standard of LAMSON quality, in a carton or a carload. Enjoy the advantages afforded by the complete LAMSON line—from one source, at one time, and in the same shipment. THE LAMSON & SESSIONS COMPANY, General Offices, Cleveland, Ohio. *Five plants*—at Cleveland and Kent, Ohio; Chicago and Birmingham.

Your Jobber Stocks the LAMSON Line

LAMSON & SESSIONS

Let US Shoulder the Responsibility for your Intricate Castings

UNUSUAL STEEL CASTINGS, such as this rock cutter for a dredge, are all in the day's work at Birdsboro.

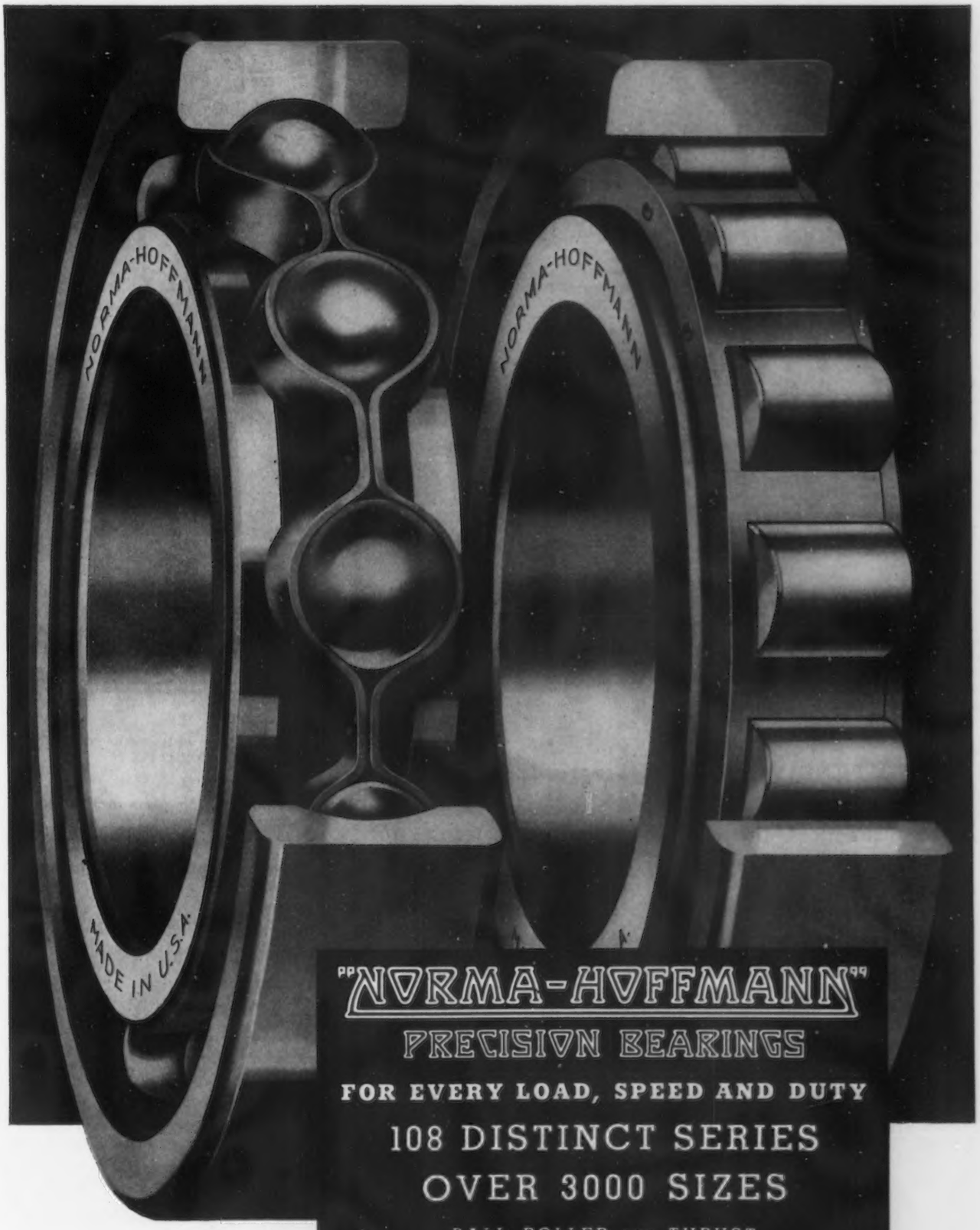
All sorts of intricate shapes are being made possible by the new Randupson Process. Introduced to America by Birdsboro only a few years ago, this process, combined with nearly half a century of foundry experience, is producing castings that set a new standard for the industry.

Birdsboro R-P castings are more faithful to pattern—give you sound, dependable metal without pin holes or fins—and a smooth surface free from nail heads. They are cheaper to use because their accuracy and clean surface reduces machining time to a minimum.

Specify Birdsboro R-P on that next casting job. Let *us* shoulder the responsibility for your large and intricate castings.

BIRDSBORO
STEEL FOUNDRY AND MACHINE COMPANY
BIRDSBORO, PENNSYLVANIA

STEEL CASTINGS • HYDRAULIC MACHINERY • SPECIAL MACHINERY • CRUSHING MACHINERY • STEEL MILL EQUIPMENT • STEEL AND CHILL ROLLS



"NORMA-HOFFMANN"

PRECISION BEARINGS

FOR EVERY LOAD, SPEED AND DUTY

108 DISTINCT SERIES

OVER 3000 SIZES

BALL, ROLLER AND THRUST

1/8" to 21" Bore—Metric and Inch Sizes

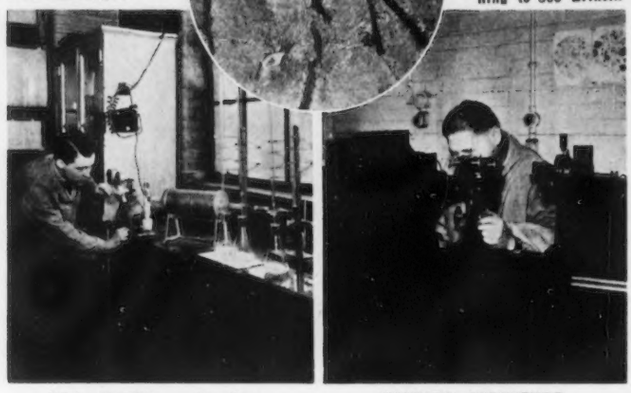
Write for the Catalog and Engineering Counsel

NORMA-HOFFMANN BEARINGS CORPORATION, STAMFORD, CONN., U.S.A.

12 ways to SAVE MONEY with modern GRAY IRON CASTINGS

STRENGTH — Tensiles up to 60,000 pounds P.S.I. and higher

MACHINABILITY— With hardnesses running to 300 Brinell.



NEW ALLOYS — Having entirely new uses.

UNIFORM STRUCTURE — Assured by metallurgical control.

The foundry metallurgist uses scientific apparatus to calculate the physical qualities of your castings before they are poured. These modern research and control facilities have pooled their knowledge to give you improved results and lowered costs.

INTENSIVE research, progressively continued for years, combined with modernized foundry practices, offers new money-saving results for Gray Iron Casting Users.

Increased strength permits new uses and enables lighter sections to be employed. That saves money in machine construction. And besides, sales appeal of your product is heightened by the smooth surface, symmetrical lines, and intricate forms into which Gray Iron can be easily fabricated. There are twelve distinct benefits offered by Gray Iron—new to many and still old enough to have been proven in every recommended application.

Your foundryman can help you enjoy these profit-building savings. He can also suggest ways of lowering your first cost with modern pattern equipment and his knowledge of metal mixture.

STRENGTH
New alloys with tensile strengths up to 60,000 lbs. P.S.I.

RIGIDITY
Holds moving parts in free running alignment.

LOW EXPANSION COEFFICIENT
prevents strains due to thermal changes

RESISTANCE
to heat, rust and corrosion.

MACHINES EASILY

LOW COST
of duplicate parts.

INTRICATE SHAPES
easily produced.

UNIFORMITY
of duplicate parts.

GOOD BEARING PROPERTIES
permit use in moving parts.

MINIMUM WASTE
in machining.

IMPROVES APPEARANCE
of your equipment with its smooth surfaces and symmetrical lines.

DAMPING EFFECT
retards vibration and noise.

GRAY IRON FOUNDERS' SOCIETY, INC.

In Silver Craftsmanship or Tool Craftsmanship

YEARS OF EXPERIENCE MEAN

THERE IS A DIFFERENCE

There is no substitute for *years of experience* in the craftsmanship that shapes fine sterling designs. Nor in the craftsmanship that guards every process in the manufacture of Morse Tools.

Next time a drilling, reaming, threading or milling job calls for a tool whose manufacture is tempered with experience, prove to yourself that "There Is A Difference."

A Conveniently Located Morse Distributor Will Give You Prompt Service

MORSE

TWIST DRILL AND MACHINE CO., NEW BEDFORD, MASS., U. S. A.

New York Store 130 LAFAYETTE ST.

Chicago Store 570 WEST RANDOLPH ST.

THE MORSE LINE INCLUDES HIGH SPEED AND CARBON DRILLS - REAMERS - CUTTERS - TAPS and DIES - SCREW PLATES - ARBORS - CHUCKS - COUNTERBORES - MANDRELS - TAPER PINS - SOCKETS - SLEEVES

"SINCE MY LAST CALL ON THE ABOVE PLANT I FIND"

—*A Typical Beginning* of some 25,000 impartial reports by Socony-Vacuum Field Engineers...to guide us in refining oils suited to actual Plant conditions

How Socony-Vacuum Engineering Service can save money in your plant:

1. Curb losses that boost power consumption and costs.
2. Decrease maintenance.
3. Improve production results by greater machine efficiency.
4. Lower lubrication costs.
5. Help your men find ways to devise important economies.

TONIGHT—in hotels across the country—Socony-Vacuum Field Engineers are writing their reports!

News of what Gargoyle Lubricants did today *in service*.

News of new methods...problems.

These hard-boiled facts leave no loopholes. Gargoyle Lubricants must meet operating conditions!

Because they do—Socony-Vacuum "Correct Lubrication" has saved millions in 110 different industries. Improved production. Lowered power, maintenance and oil costs.

The advice of a Socony-Vacuum Engineer may result in surprising economies in your own plant. A word from you will bring him there.

SOCONY-VACUUM

CORRECT LUBRICATION

GARGOYLE Lubricants

SAVES MONEY FOR INDUSTRY

Read what 71 Years' Lubricating Experience...the Greatest in the Oil Business...can do for You. See Next Page

THIS MARKETING POLICY MEANS "CORRECT LUBRICATION" FOR EVERY TYPE OF PLANT

INDUSTRY ALMOST ALWAYS FINDS that the controlled use of high-grade Gargoyle Lubricants pays for itself many times over and that they actually cost less to use than ordinary lubricants.

But, for such equipment as does not justify the highest-grade lubricants, Socony-Vacuum Engineers will always recommend a lower-priced lubricant when consistent with true economy.

Socony-Vacuum, with a complete line of products, can supply the lubricants best fitted for the requirements of the individual lubricating job as determined by specific operating conditions.

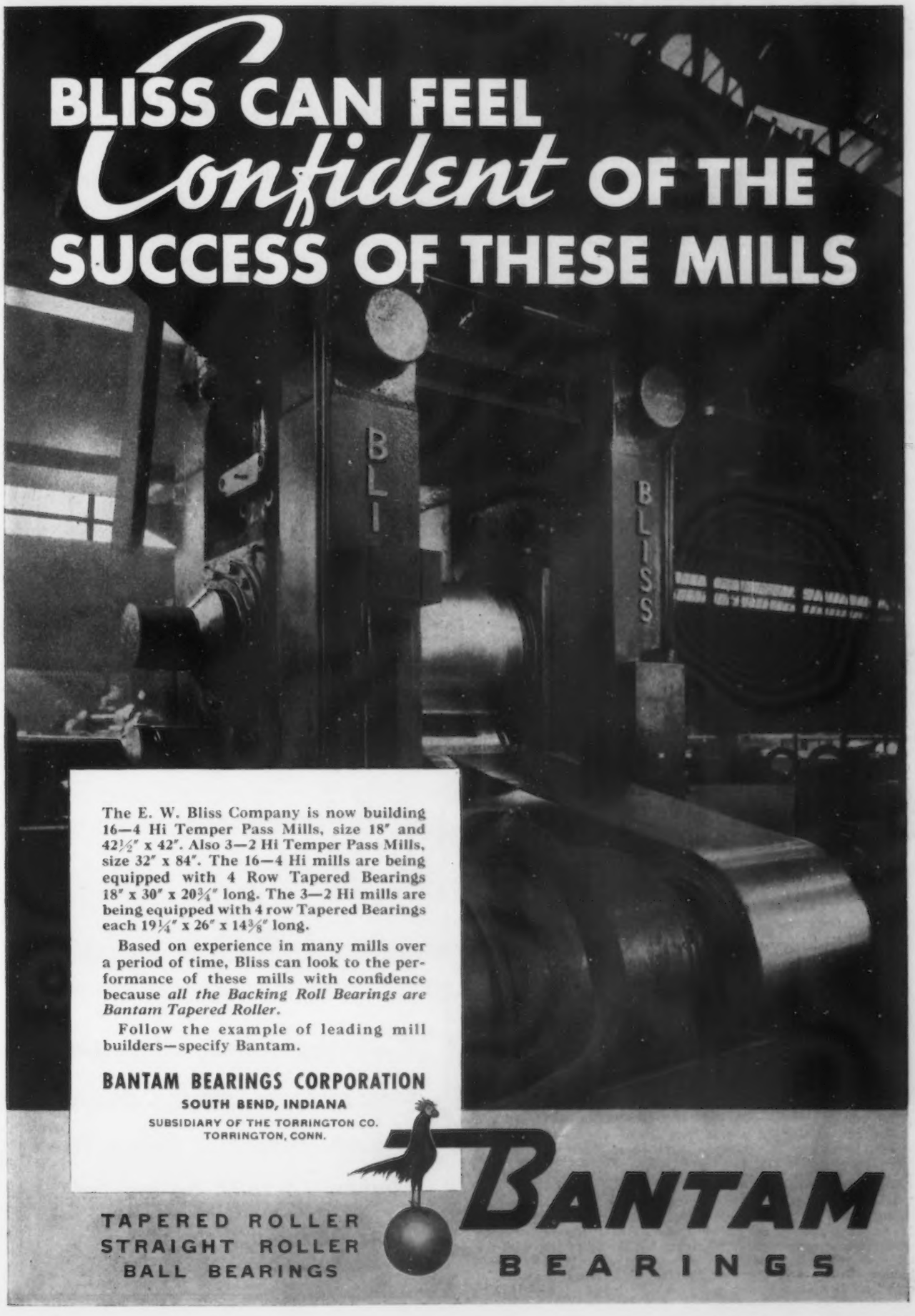
Socony-Vacuum Engineers bring you years of world-wide experience and direct cooperation with manufacturers of equipment. Lubrication Profit is the inevitable result.

SEND FOR THE SOCONY-VACUUM REPRESENTATIVE: *The services of a trained Socony-Vacuum Engineer are available at all times in helping your men to solve lubrication problems.*

SOCONY-VACUUM OIL CO.
INCORPORATED

STANDARD OIL OF NEW YORK DIVISION · WHITE STAR DIVISION · LUBRITE DIVISION · WHITE EAGLE DIVISION
WADHAMS OIL COMPANY · MAGNOLIA PETROLEUM COMPANY · GENERAL PETROLEUM CORPORATION OF CALIFORNIA

GARGOYLE Lubricants



The E. W. Bliss Company is now building 16—4 Hi Temper Pass Mills, size 18" and 42½" x 42". Also 3—2 Hi Temper Pass Mills, size 32" x 84". The 16—4 Hi mills are being equipped with 4 Row Tapered Bearings 18" x 30" x 20¾" long. The 3—2 Hi mills are being equipped with 4 row Tapered Bearings each 19¼" x 26" x 14⅜" long.

Based on experience in many mills over a period of time, Bliss can look to the performance of these mills with confidence because *all the Backing Roll Bearings are Bantam Tapered Roller.*

Follow the example of leading mill builders—specify Bantam.

BANTAM BEARINGS CORPORATION
SOUTH BEND, INDIANA
SUBSIDIARY OF THE TORRINGTON CO.
TORRINGTON, CONN.

TAPERED ROLLER
STRAIGHT ROLLER
BALL BEARINGS

BANTAM
BEARINGS

JUST BETWEEN US TWO

Blurb

DESPITE the fact that the CIO, Washington, resigned from the one big, more or less happy family of Iron Age readers, it (the family) waxed in November. Blind to business trend charts, more newcomers came with us last month than in the preceding November.

Noodling

ONE of the new faces belongs to a noodle machinery manufacturer—the Vitantonio Mfg. Co., Cleveland. We have a vague idea that noodles are extruded, and if that is so, there is no practical limit to the shape of their cross section.

Doubtless the noodle of conventional rectangular section cooks most quickly—Mrs. Bertha Gilchrist, who says she reads this column, would know—but we see a market for noodles in the shape of channels, I beams, angles, T's, squares, triangles, half rounds and so on, for structural planning.

While there are disturbing rumors afloat regarding the maximum stress, yield point and elongation of the average noodle (*not* the alloy noodle), this material has its advantages for structural purposes. If the design proves to be a kluck you can always eat it. We hope the Vitantonio people and the American Institute for Steel Construction will get together.

And Wounds Washed in Salt Water

A SHARP-EYED young lady writes anonymously that the wrong month was mentioned recently in an average price column. The editor responsible has been given the usual twenty-one lashes.

Limelights Product Instead of Self

PARADOXICALLY, a not too serious approach oftentimes heightens the seriousness with which the subject introduced is received. As an excellent example, we cite the new catalogue of the Service Caster & Truck Co., which begins:

> *"We might show pictures of our factories. . . . We might recite in boresome detail our many policies. . . . We might reproduce the photographic likeness of our President, a fine fellow and not bad looking, but who cares?"*

Eureka

THE Skybryte people have developed a liquid for applying to the windows of buildings adjacent to wide open spaces where large expanses of snow would cause glare. Scene: Skybryters gathered around table, brows in hands, thinking like anything about a name for the product—*No-sno-glare—Glare-kill—Snocide* —and fifty more of the same. And then, at about three in the morning—out pops the perfect name—***Snopake.*** An orchid to its coiner.

They Insist Upon Chemicals

WITHIN the territory of B. L. Herman, one of your favorite journal's advertising representatives, lies Niagara Falls, the home of du Pont's Roessler & Hasslacher Chemical Co. As Roessler & Hasslacher gives the tonsils too much of a workout, it is abbreviated locally to "R. & H."

"R. & H." sounds so much like "Iron Age" that when Mr. Herman, as he is familiarly known, makes any calls in the honeymoon area he has the devil's own job to keep himself from being routed through to the man who buys chemicals.

That's His Story and They're Stuck With It

A YOUNG lady who announced herself as the secretary of a professor in a local university called the other day for a clipping of a factory description published in a 1922 issue. We were out of it and asked if something more recent would do. *"No,"* she said, *"the professor likes that particular article and has used it for years in his classes."*

His subject isn't ancient history. It seems he has some kind of a fixation on the early '20s. Think of the surprises in store for his students when and if they land jobs in industry.

Consecutive Bull's-eyes

THE two editorials on the surplus profits tax, in the Dec. 2 and 9 issues, established a new high record—for us—in point of interest aroused. The pile of letters about them reaches from here to here. Write if you want copies.

Roll 'em Again, Whitey

THE more we stare at that "natural" Whitey Maurath threw on page 23 of the Dec. 2 issue the more it seems to us that there is something about it not strictly kosher. One of the dice, the one with the four uppermost, is all right. But the other one, with the three showing, is standing on edge. In the Little Falls Overbidding Bridge and Dynamic Domino Club that roll would be called no dice.

—A.H.D.

Products Index

Products Index

New Departure Div., General Motors Corp., Bristol, Conn.
Norma-Hoffmann Bearings Corp., Stamford, Conn.
SKF Industries, Inc., Front St. & Erie Ave., Phila., Pa.
Schatz Mfg. Co., Poughkeepsie, N. Y.

BEARINGS, Brass and Bronze
Ampco Metal, Inc., Milwaukee, Wis.
Bunting Brass & Bronze Co., Toledo, O.
Johnson Bronze Co., 505 So. Mill St., New Castle, Pa.
Lawrenceville Bronze Co., Pittsburgh.
National Bearing Metals Corp., Pittsburgh.

BEARINGS—Oilless
Bunting Brass & Bronze Co., Toledo, O.
Rhoades, R. W., Metaline Co., Inc., Long Island City, N. Y.
Richardson Co., The, Melrose Park, Ill.

BEARINGS—Quill
Bantam Bearings Corp., The, South Bend, Indiana.

BEARINGS—Radial
Bantam Bearings Corp., The, South Bend, Indiana.
Federal Bearings Co., Inc., The, Poughkeepsie, N. Y.
Hyatt Bearings Div., General Motors Corp., Newark, N. J.
New Departure Div., General Motors Corp., Bristol, Conn.
Norma-Hoffmann Bearings Corp., Stamford, Conn.
SKF Industries, Inc., Front St. & Erie Ave., Phila., Pa.
Schatz Mfg. Co., The, Poughkeepsie, N. Y.
Shafer Bearing Corp., 35 East Wacker Drive, Chicago.

BEARINGS—Roll Neck
Bantam Bearings Corp., The, South Bend, Indiana.
Morgan Construction Co., Worcester, Mass.
SKF Industries, Inc., Front St. & Erie Ave., Phila., Pa.
Shafer Bearing Corp., 35 East Wacker Drive, Chicago.
Timken Roller Bearing Co., The, Canton, O.

BEARINGS—Roller
Bantam Bearings Corp., The, South Bend, Indiana.
Hyatt Bearings Div., General Motors Corp., Newark, N. J.
Norma-Hoffmann Bearings Corp., Stamford, Conn.
SKF Industries, Inc., Front St. & Erie Ave., Phila., Pa.
Shafer Bearing Corp., 35 East Wacker Drive, Chicago.
Timken Roller Bearing Co., The, Canton, O.

BEARINGS—Roller Tapered
Bantam Bearings Corp., The, South Bend, Indiana.
Timken Roller Bearing Co., The, Canton, O.

BEARINGS—Rolling Mill Equipment
Bantam Bearings Corp., The, South Bend, Indiana.
Richardson Co., The, Melrose Park, Ill.
SKF Industries, Inc., Front St. & Erie Ave., Phila., Pa.
Timken Roller Bearing Co., The, Canton, O.

BEARINGS—Self-aligning Roller
Shafer Bearing Corp., 35 East Wacker Drive, Chicago.

BEARINGS—Shaft Hanger
Hyatt Bearings Div., General Motors Corp., Newark, N. J.
Norma-Hoffmann Bearings Corp., Stamford, Conn.
SKF Industries, Inc., Front St. & Erie Ave., Phila., Pa.
Shafer Bearing Corp., 35 East Wacker Drive, Chicago.

BEARINGS—Thrust
Bantam Bearings Corp., The, South Bend, Indiana.
Federal Bearings Co., Inc., The, Poughkeepsie, N. Y.
Hyatt Bearings Div., General Motors Corp., Newark, N. J.
New Departure Div., General Motors Corp., Bristol, Conn.
Norma-Hoffmann Bearings Corp., Stamford, Conn.
SKF Industries, Inc., Front St. & Erie Ave., Phila., Pa.
Schatz Mfg. Co., The, Poughkeepsie, N. Y.
Shafer Bearing Corp., 35 East Wacker Drive, Chicago.
Timken Roller Bearing Co., The, Canton, O.

BELT DRESSING
Rhoads, J. E., & Sons, Philadelphia.

BELT LACING
Rhoads, J. E., & Sons, Philadelphia.

BELT—Conveyor, Elevator
Goodyear Tire & Rubber Co., Akron, Ohio.
Goodrich, B. F., Co., The, Akron, Ohio.
Manhattan Rubber Mfg. Div. of Raybestos-Manhattan, Inc., The, 2 Townsend St., Passaic, N. J.

BELTING CEMENT
Rhoads, J. E., & Sons, Philadelphia.

BELTING—Leather
Chicago (Ill.) Rawhide Mfg. Co., The, 1306 Elston Ave.
Rhoads, J. E., & Sons, Philadelphia.

BELTING—Metal, Conveyor, High and Low Temperature
Acme Steel Co., Chicago, Ill.
Cambridge (Md.) Wire Cloth Co.
Wickwire Spencer Steel Co., 41 East 42nd St., N. Y. C.

BELTING—Rubber
Goodrich, B. F., Co., The, Akron, Ohio.
Goodyear Tire & Rubber Co., Akron, Ohio.
Manhattan Rubber Mfg. Div. of Raybestos-Manhattan, Inc., The, 2 Townsend St., Passaic, N. J.
Robins Conveying Belt Co., 15 Park Row, N. Y. C.

BELTS—V-Type
Allis-Chalmers Mfg. Co., Milwaukee.
Goodyear Tire & Rubber Co., Akron, Ohio.
Manhattan Rubber Mfg. Div. of Raybestos-Manhattan, Inc., The, 2 Townsend St., Passaic, N. J.

BENDING MACHINES—Hand, Band and Angle
Excelsior Tool & Mch. Co., E. St. Louis, Ill.

BENDING MACHINES—Hand and Power
Cincinnati (Ohio) Shaper Co., The.
Dreis & Krump Mfg. Co., Chicago.
G. D. S. Machinery & Supply Co., Inc., 101 Walker St., N. Y. C.
Niagara Machine & Tool Works, Buffalo, N. Y.

BENZOL RECOVERY PLANTS.
Koppers Co., Pittsburgh.

BERYLLIUM COPPER
American Brass Co., The, Waterbury, Conn.

BILLETS—Chrome Nickel Steel
Rustless Iron & Steel Corp., Baltimore, Md.

BILLETS—Chrome Steel
Rustless Iron & Steel Corp., Baltimore, Md.

BILLETS—Forging
Alan Wood Steel Co., Conshohocken, Pa.
Harrisburg (Pa.) Steel Corp.
Midvale Co., The, Nicetown, Phila., Pa.
Republic Steel Corp., Cleveland, Ohio.

BILLETS—Re-rolling
Alan Wood Steel Co., Conshohocken, Pa.

BILLETS—Steel
Bethelhem (Pa.) Steel Company.
Continental Steel Corp., Kokomo, Ind.
Tennessee Coal, Iron & Railroad Co. (U. S. Steel Corp. Subsidiary), Birmingham, Ala.

BIMETAL—Thermostatic
Chace, W. M., Co., 1695 Beard Ave., Detroit.

BINS—Rotating
Frick-Gallagher Mfg. Co., The, Wellston, Ohio.

BLANKS—Chisel
Cleveland Steel Tool Co., The, 660 E. 82nd St., Cleveland, Ohio.

BLANKS—Gear and Pinion
Chicago (Ill.) Rawhide Mfg. Co., The, 1306 Elston Ave.
Richardson Co., The, Melrose Park, Ill.

BLANKS—Gear, Silent Steel
Waldron, John, Corp., New Brunswick, N. J.

BLAST CLEANING EQUIPMENT
American Foundry Equipment Co., The, 401 Byrkit St., Mishawaka, Ind.
Pangborn Corporation, Hagerstown, Md.

BLAST FURNACES
Brassert, H. A., & Co., Chicago, Ill.

BLAST GATES
Rockwell, W. S., Co., 50 Church St., N. Y. C.

BLOCKS—Chain
Yale & Towne Mfg. Co., The, Phila. Div., Phila., Pa.

BLOWERS
American Air Filter Co., Inc., Louisville, Ky.
American Blower Corp., 6000 Russell St., Detroit.
Ingersoll-Rand Co., 11 Broadway, N. Y. C.
North American Mfg. Co., The, Cleveland
Spencer Turbine Co., Hartford, Conn.

BLOWPIPES—Oxy-Acetylene Welding & Cutting
Linde Air Products Company, The, 30 East 42nd St., N. Y. C.
Weldit Acetylene Co., Detroit.

BLOWPIPES — Soldering, Heating, Annealing
American Gas Furnace Co., Elizabeth, N. J.
Weldit Acetylene Co., Detroit.

BOILERS
Munroe R., & Sons Mfg. Corp., Pittsburgh.

BOILERS—Waste Heat
Babcock & Wilcox Co., The, 85 Liberty St., New York City.

BOILERS—Water Tube
Babcock & Wilcox Co., The, 85 Liberty St., New York City.

BOLT CUTTERS
Acme Machinery Co., Cleveland.
Landis Mch. Co., Inc., Waynesboro, Pa.

BOLT AND NUT MACHINERY
Acme Machinery Co., Cleveland.
Ajax Mfg. Co., The, Euclid, Ohio.
Landis Machine Co., Inc., Waynesboro, Pa.
Manville, E. J., Mch. Co., Waterbury, Ct.
Waterbury (Ct.) Farrel Fdry. & Mch. Co., The.

BOLT & RIVET CLIPPERS
Bremil Mfg Co., Erie, Pa.
Helwig Mfg. Co., St. Paul, Minn.

BOLTS—Carriage and Machine
Cleveland (Ohio) Cap Screw Co., The
Erie (Pa.) Bolt & Nut Co.
Lamson & Sessions Co., The, Cleveland.
Oliver Iron & Steel Corp., Pittsburgh.
Republic Steel Corp., Upson Nut Div., Cleveland, O.
Russell, Burdsall & Ward Bolt & Nut Co., Port Chester, N. Y.

Products Index

Products Index

CASTINGS—Aluminum
Aluminum Co. of America, Pittsburgh.
Fairmount Foundry, Inc., Phila., Pa.

CASTINGS—Brass, Bronze, Copper or Aluminum
Cadman, A. W., Mfg. Co., Pittsburgh.
Carbon Malleable Casting Co., Inc., Lancaster, Pa.
Lawrenceville Bronze Co., Pittsburgh.
National Bearing Metals Corp., Pittsburgh.
Phosphor Bronze Smelting Co.,The, Phila.
Snyder, W. P., & Co., Pittsburgh.
Spencer's, I. S., Sons, Inc., Guilford, Ct.

CASTINGS—Corrosion Resisting
Electro Alloys Co., Elyria, Ohio.
Meehanite Metal Corp., Pittsburgh.
Midvale Co., The, Nicetown, Phila., Pa.

CASTINGS—Die, Aluminum
Aluminum Co. of America, Pittsburgh.

CASTINGS—Electric Steel
Crucible Steel Castings Co., Lansdowne, Pa.
Dodge Steel Co., Philadelphia, Pa.
Lebanon (Pa.) Steel Foundry.

CASTINGS—Gray Iron
American Engineering Co., Philadelphia.
Cheney, S., & Son, Manlius, N. Y.
Commercial Steel Casting Co., Marion, Ohio.
Fairmount Foundry, Inc., Phila., Pa.
Laconia (N. H.) Malleable Iron Co., Inc.
Lane Mfg. Co., Montpelier, Vt.
Midvale Co., The, Nicetown, Phila., Pa.
Murray Iron Wks. Co., Burlington, Iowa.
National Roll & Fdry. Co., Avonmore, Pa.
North Wales (Pa.) Mach. Co., Inc.
Spencer's, I. S., Sons, Inc., Guilford, Ct.

CASTINGS—High Test & Alloy Iron
Meehanite Metal Corp., Pittsburgh.

CASTINGS—Magnesium Alloys
Dow Chemical Co., The, 921 Jefferson Ave., Midland, Mich.

CASTINGS—Malleable
Baltimore (Md.) Malleable Iron & Steel Casting Co.
Carbon Malleable Casting Co., Inc., Lancaster, Pa.
Laconia (N. H.) Malleable Iron Co., Inc.
Lake City Malleable Co., The, 5100 Lakeside Ave., Cleveland.
Malleable Iron Fittings Co., Branford, Ct.
Peoria (Ill.) Malleable Castings Co.

CASTINGS—Meehanite Metal
Meehanite Metal Corp., Pittsburgh.

CASTINGS—Monel & Nickel
Superior Bronze Corp., Erie, Pa.

CASTINGS—Semi-Steel
Malleable Iron Fittings Co., Branford, Ct.

CASTINGS—Steel
Bethlehem (Pa.) Steel Company.
Birdsboro (Pa.) Steel Foundry & Machine Co.
Carnegie-Illinois Steel Corp. (U. S. Steel Corp. Subsidiary), Pittsburgh & Chicago.
Columbia Steel Co. (U. S. Steel Corp. Subsidiary), San Francisco, Calif.
Commercial Steel Casting Co., Marion, Ohio.
Crucible Steel Castings Co., Lansdowne,Pa.
Dodge Steel Co., Philadelphia, Pa.
Hartford (Conn.) Electric Steel Corp.
Lebanon (Pa.) Steel Foundry.
Mackintosh-Hemphill Co., Pittsburgh.
Malleable Iron Fittings Co., Branford, Ct.
Mesta Mch. Co., Pittsburgh.
Midvale Co., The, Nicetown, Phila., Pa.
Standard Steel Wks. Co., Burnham, Pa.

CASTINGS—Wear Resisting
Meehanite Metal Corp., Pittsburgh.

CEMENT—Acid-Proof
Atlas Mineral Products Co. of Pa., The, Mertztown, Pa.
Nukem Products Corp., 68 Niagara St., Buffalo, N. Y.
Pennsylvania Salt Mfg. Co., Philadelphia, Pa.

CEMENT—Refractory
Carborundum Co., The, Perth Amboy, N. J.
Johns-Manville Corp., 22 East 40th St., New York City.
Quigley Co., Inc., 56 West 45th St., N. Y. C.

CEMENT—Rubber
Goodrich, B. F., Co., The, Akron, Ohio.

CHAINS—Conveyor & Elevator
Baldwin-Duckworth Chain Corp., Springfield, Mass.
Bartlett, C. O.-Snow Co., The, Cleveland.
Diamond Chain & Mfg. Co., Indianapolis, Ind.
Webster Mfg. Co., Chicago.

CHAINS—Portable
Barrett-Cravens Co., Chicago, Illinois

CHAINS—Power Transmission
Baldwin-Duckworth Chain Corp., Springfield, Mass.
Boston Gear Works, Inc., North Quincy, Mass.
Diamond Chain & Mfg. Co., Indianapolis, Ind.
Link-Belt Co., Chicago.
Morse Chain Co., Ithaca, New York.
Ramsey Chain Co., Inc., Albany, N. Y.
Webster Mfg. Co., Chicago.
Whitney Chain & Mfg. Co., Hartford, Ct.

CHAINS—Roller
Baldwin-Duckworth Chain Corp., Springfield, Mass.
Bartlett, C. O.-Snow Co., The, Cleveland.
Diamond Chain & Mfg. Co. Indianapolis, Ind.
Link-Belt Co., Chicago.
Morse Chain Co., Ithaca, New York.
Whitney Chain & Mfg. Co., Hartford, Ct.

CHAINS—Silent
Link-Belt Co., Chicago.
Morse Chain Co., Ithaca, New York.
Ramsey Chain Co., Inc., Albany, N. Y.
Whitney Chain & Mfg. Co., Hartford, Ct.

CHANNELS—See Angles, Beams, Channels and Tees

CHECKS—Metal
Cunningham, M. E., Co., Pittsburgh.
Noble & Westbrook Mfg. Co., The, East Hartford, Ct.

CHEMICALS—Industrial
Du Pont de Nemours, E. I., & Co., Inc., Grasselli Chemicals Dept., Wilmington, Del.
Pennsylvania Salt Mfg. Co., Philadelphia, Pa.

CHEMICALS—Rust Proofing
Parker Rust-Proof Co., 2186 Milwaukee Ave., Detroit.
Udylite Co., The, Detroit.

CHROMIUM METAL & ALLOYS
Electro Metallurgical Sales Corp., 30 East 42nd St., N. Y. C.

CHUCKING MACHINES—Multiple Spindle
Baird Mch. Co., The, Bridgeport, Conn.
Goss & DeLeeuw Machine Co., New Britain, Conn.
National Acme Co., The, Cleveland.

CHUCKS—Air Operated
Hanniffin Mfg. Co., Chicago.

CHUCKS—Drill
Cleveland (Ohio) Twist Drill Co., The.
Cushman Chuck Co., Hartford, Conn.
Morse Twist Drill & Mach. Co., New Bedford, Mass.

CHUCKS—Electric
Cushman Chuck Co., Hartford, Conn.

CHUCKS—Lathe
Cushman Chuck Co., Hartford, Conn.

CHUCKS—Magnetic
Heald Mch. Co., Worcester, Mass.
Taft-Peirce Mfg. Co.,The,Woonsocket,R.I.

CIRCLES—Phosphor Bronze
Phosphor Bronze Smelting Co.,The, Phila.
Revere Copper & Brass, Inc., 230 Park Ave., N. Y. C.

CLEANERS—Metal
American Chemical Paint Co., Ambler, Pa.
Detroit Rex Products Co., Detroit, Mich.
Ford, J. B., Co., The, Wyandotte, Mich.
Pennsylvania Salt Mfg. Co., Phila., Pa.

CLEANING COMPOUNDS—Alkali
Detroit Rex Products Co., Detroit, Mich.
Pennsylvania Salt Mfg. Co., Philadelphia, Pa.

CLEANING EQUIPMENT—Metal
Detroit Rex Products Co., Detroit, Mich.

CLEANING EQUIPMENT (Metal)—Electro-Chemical
Bullard Co., The, Bridgeport, Conn.

CLOTHING—Asbestos & Fireproof
Safety Equipment Service Co., Cleveland.

CLUTCH-BRAKES—Magnetic
Stearns Magnetic Mfg. Co., 635 So. 28th St., Milwaukee.

CLUTCHES
Fairbanks, Morse & Co., Chicago.
Falls Clutch & Mchry. Co., The, Cuyahoga Falls, Ohio.
Jones, W. A., Fdry. & Mch. Co., 4401 Roosevelt Rd., Chicago.
Medart Co., The, St. Louis, Mo.
Morse Chain Co., Ithaca, New York.

CLUTCHES—Magnetic
Cutler-Hammer, Inc., Milwaukee.
Dings Magnetic Separator Co., Milwaukee.
Stearns Magnetic Mfg. Co., 635 So. 28th St., Milwaukee.

COAL
Cleveland-Cliffs Iron Co., The, Cleveland, Ohio.
Hanna Furnace Corp., The, Detroit, Mich.
Koppers Coal Co., Inc., The, Pittsburgh.
Pickands Mather & Co., Cleveland.

COAL, ORE AND ASH HANDLING MACHINERY
Bartlett, C. O.-Snow Co., The, Cleveland.
Robins Conveying Belt Co., 15 Park Row, N. Y. C.
Webster Mfg. Co., Chicago.

COBALT METAL
Central Trading Corp., 511 Fifth Ave., N. Y. C.

COILS—Lead
National Lead Co., 111 Bdway., N. Y. C.

COILS—Pipe
Harrisburg (Pa.) Steel Corp.

COKE—Metallurgical
Cleveland-Cliffs Iron Co., The, Cleveland, Ohio.
Pickands Mather & Co., Cleveland.

COKE OVEN MACHINERY
Atlas Car & Mfg. Co., The, Cleveland.
Koppers Co., Pittsburgh.

COKE OVENS—By-Products
Koppers Co., Pittsburgh.

COKE OVENS—Cross Regenerators
Koppers Co., Pittsburgh.

COKE OVENS—With Recovery of By-Products
Koppers Co., Pittsburgh.

COLLETS
Rivett Lathe & Grinder, Inc., Boston, Mass.

COLUMBIUM
Electro Metallurgical Sales Corp., 30 E. 42nd St., N. Y. C.

Products Index

COMBUSTION CONTROLS
Brown Instrument Co., The, Philadelphia, Pa.
Leeds & Northrup Co., Philadelphia.
Morgan Construction Co., Worcester, Mass.
North American Mfg. Co., The, Cleveland.

COMPOUNDS—Drawing
Gulf Oil Corp., Gulf Refining Co., Pittsburgh.
Socony-Vacuum Oil Co., Inc., 26 Broadway, N. Y. C.
Standard Oil Co. (Indiana), Chicago.
Tide Water Associated Oil Co., 17 Battery Place, N. Y. C.

COMPRESSORS—Air
Curtis Pneumatic Machinery Co., 1948 Kienlen Ave., St. Louis, Mo.
Fairbanks, Morse & Co., Chicago.
Ingersoll-Rand Co., 11 Broadway, New York City.
Pennsylvania Pump & Compressor Co., Easton, Pa.
Spencer Turbine Co., Hartford, Conn.
Sullivan Machinery Co., Michigan City, Ind.
Westinghouse Air Brake Co., Industrial Div., Pittsburgh.
Worthington Pump & Machinery Corp., Harrison, N. J.

COMPRESSORS—Gas
Sullivan Machinery Co., Michigan City, Ind.
Worthington Pump & Machinery Corp., Harrison, N. J.

COMPRESSORS—Rebuilt. (See Clearing House Section)

CONCRETE CONSTRUCTION
Ferguson, H. K., Co., The, Cleveland.

CONDENSERS—Surface & Jet
Ingersoll-Rand Co., 11 Broadway, N.Y.C.
Pennsylvania Pump & Compressor Co., Easton, Pa.
Westinghouse Electric & Mfg. Co., East Pittsburgh, Pa.
Worthington Pump & Machinery Corp., Harrison, N. J.

CONDUITS—Flexible Metallic
Pennsylvania Flexible Metallic Tubing Co., Philadelphia.

CONTRACTORS' SUPPLIES — Second-Hand. (See Clearing House Section)

CONTROL SYSTEMS—Temperature
Leeds & Northrup Co., Philadelphia.

CONTROLLERS—Crane
Cutler-Hammer, Inc., Milwaukee.

CONTROLLERS—Electric
Cutler-Hammer, Inc., Milwaukee.
Electric Controller & Mfg. Co., The, Cleveland.
General Electric Co., Schenectady, N. Y.

CONTROLLERS—Valve, Electrically Operated
Brown Instrument Co., The, Philadelphia, Pa.
Cutler-Hammer, Inc., Milwaukee.
Leeds & Northrup Co., Philadelphia.

CONVEYING AND ELEVATING MACHINERY
Bartlett, C. O.-Snow Co., The, Cleveland.
Link-Belt Co., Chicago.
Logan Co., Inc., Louisville, Ky.
Mathews Conveyer Co., Ellwood City, Pa.
Robins Conveying Belt Co., 15 Park Row, N. Y. C.

CONVEYOR WORMS
Lee Spring Co., Inc., 30 Main St., Brooklyn, N. Y.

CONVEYORS—Gravity
Logan Co., Inc., Louisville, Ky.
Mathews Conveyer Co., Ellwood City, Pa.

CONVEYORS—Monorail
American Monorail Co., The, Cleveland.
Cleveland Tramrail Div. of The Cleveland Crane & Engng. Co., Wickliffe, Ohio.

CONVEYORS—Portable
Farquhar, A. B., Co., Ltd., York, Pa.
Robins Conveying Belt Co., 15 Park Row, N. Y. C.

COPING MACHINES
Schatz Mfg. Co., The, Poughkeepsie, N. Y.

CORE OIL
Socony-Vacuum Oil Co., Inc., 26 Broadway, N. Y. C.
Sun Oil Co., Philadelphia.
Tide Water Associated Oil Co., 17 Battery Place, N. Y. C.

CORUNDUM WHEELS — See Grinding Wheels

COTTERS AND KEYS—Spring
Hindley Mfg. Co., Valley Falls, R. I.
Hubbard, M. D., Spring Co., 750 Central Ave., Pontiac, Mich.
Lamson & Sessions Co., The, Cleveland.
Western Wire Prods. Co., St. Louis, Mo.

COUNTERBORES
Cleveland (Ohio) Twist Drill Co., The.
Morse Twist Drill & Mch. Co., New Bedford, Mass.

COUNTERS—Production
Durant Mfg. Co., Milwaukee, Wis.
Veeder-Root, Inc., Hartford, Ct.

COUNTERS—Revolution, Recording
Durant Mfg. Co., Milwaukee, Wis.

COUNTING MACHINES
Veeder-Root, Inc., Hartford, Conn.

COUPLINGS—Air Hose
Cleveland (Ohio) Pneumatic Tool Co., The.

COUPLINGS—Cut-off Friction
Jones, W. A., Fdry. & Mch. Co., 4401 Roosevelt Rd., Chicago.

COUPLINGS—Flexible
Diamond Chain & Mfg. Co., Indianapolis, Ind.
Lovejoy Flexible Coupling Co., Chicago.
Morse Chain Co., Ithaca, New York.
Poole Foundry & Mch. Co., Baltimore, Md.
Ramsey Chain Co., Inc., Albany, N. Y.
Waldron, John, Corp., New Brunswick, N. J.

COUPLINGS—Pipe
Harrisburg (Pa.) Steel Corp.
National Tube Co. (U. S. Steel Corp. Subsidiary), Pittsburgh.

CRANES—Crawling Tractor
Browning Crane & Shovel Co., Cleveland.
Harnischfeger Corp., 4401 W. National Ave., Milwaukee.
Industrial Brownhoist Corp., Bay City, Mich.
Ohio Locomotive Crane Co., The, Bucyrus, Ohio.

CRANES — Electric, Industrial, Truck Mounted
Baker-Raulang Co., The, 2175 W. 25th St., Cleveland.
Browning Crane & Shovel Co., Cleveland.
Elwell-Parker Electric Co., The, Cleveland.

CRANES—Electric Traveling
Armel, James P., Pittsburgh.
Cleveland Crane & Engineering Co., Wickliffe, Ohio.
Conco Engineering Works, Mendota, Ill.
Curtis Pneumatic Machinery Co., 1948 Kienlen Ave., St. Louis, Mo.
Electric Hoist & Motor Co., 149 N. 9th St., Bklyn., N. Y.
Euclid Crane & Hoist Co., The, Euclid, O.
Harnischfeger Corp., 4401 W. National Ave., Milwaukee, Wis.
Maris Brothers, Inc., Philadelphia.
Morgan Engineering Co., The, Alliance, O.
Northern Engineering Works, Detroit, Mich.
Robbins & Myers, Inc., Springfield, Ohio.
Shaw-Box Crane & Hoist Div. Manning, Maxwell & Moore, Inc., 402 Broadway, Muskegon, Mich.
Shepard Niles Crane & Hoist Corp., Montour Falls, N. Y.
Whiting Corp., Harvey, Ill.

CRANES—Gantry
Browning Crane & Shovel Co., Cleveland.
Cleveland Crane & Engineering Co., Wickliffe, Ohio.
Harnischfeger Corp., 4401 W. National Ave., Milwaukee.
Morgan Engineering Co., The, Alliance, O.
Whiting Corp., Harvey, Ill.

CRANES—Hand Power
American Monorail Co., The, Cleveland.
Cleveland Crane & Engineering Co., Wickliffe, Ohio.
Cleveland Tramrail Div. of The Cleveland Crane & Engng. Co., Wickliffe, Ohio.
Conco Engineering Works, Mendota, Ill.
Curtis Pneumatic Machinery Co., 1948 Kienlen Ave., St. Louis, Mo.
Euclid Crane & Hoist Co., The, Euclid, O.
Harnischfeger Corp., 4401 W. National Ave., Milwaukee.
Industrial Brownhoist Corp., Bay City, Mich.
Maris Brothers, Inc., Philadelphia.
Northern Engineering Works, Detroit.
Shaw-Box Crane & Hoist Div. Manning, Maxwell & Moore, Inc., 402 Broadway, Muskegon, Mich.

CRANES—Jib
American Monorail Co., The, Cleveland.
Cleveland Tramrail Div. of the Cleveland Crane & Engng. Co., Wickliffe, Ohio.
Conco Engineering Works, Mendota, Ill.
Euclid Crane & Hoist Co., The, Euclid, O.
Shaw-Box Crane & Hoist Div. Manning, Maxwell & Moore, Inc., 402 Broadway, Muskegon, Mich.
Whiting Corp., Harvey, Ill.

CRANES—Locomotive
Browning Crane & Shovel Co., Cleveland.
Harnischfeger Corp., 4401 W. National Ave., Milwaukee.
Industrial Brownhoist Corp., Bay City, Mich.
Ohio Locomotive Crane Co., The, Bucyrus, O.

CRANES—Monorail
American Monorail Co., The, Cleveland.
Cleveland Tramrail Div. of The Cleveland Crane & Engng. Co., Wickliffe, Ohio.
Euclid Crane & Hoist Co., The, Euclid, O.
Northern Engineering Works, Detroit.
Shaw-Box Crane & Hoist Div. Manning, Maxwell & Moore, Inc., 402 Broadway, Muskegon, Mich.
Shepard Niles Crane & Hoist Corp., Montour Falls, N. Y.

CRANES—Portable
Canton Fdry. & Mch. Co., Cleveland.

CRANES—Portable Electric
Baker-Raulang Co., The, 2175 W. 25th St., Cleveland.
Elwell-Parker Electric Co., The, Cleveland.

CRANKSHAFTS
Transue & Williams Steel Forging Corp., Alliance, Ohio.
Union Drawn Steel Co., Massillon, Ohio.

CRANKSHAFTS—Forged
Bay City Forge Co., Erie, Pa.

CRUSHERS—Coal
American Pulverizer Co., 1439 Macklind Ave., St. Louis, Mo.

CRUSHERS—Steel Turning
American Pulverizer Co., 1439 Macklind Ave., St. Louis, Mo.

CUTTERS—Die Sinking
Pratt & Whitney Div. Niles-Bement-Pond Co., Hartford, Conn.
Tomkins-Johnson Co., The, Jackson, Mich.

Products Index

CUTTERS—Keyseating
Davis Keyseater Co., 400 Exchange St. Rochester, N. Y.

CUTTERS—Milling
Brown & Sharpe Mfg. Co., Providence, R. I.
Cleveland (Ohio) Twist Drill Co., The.
Ex-Cell-O Corp., 1200 Oakman Blvd., Detroit.
Morse Twist Drill & Mch. Co., New Bedford, Mass.
Pratt & Whitney Div. Niles-Bement-Pond Co., Hartford, Conn.

CUTTING-OFF MACHINES—Abrasives
Tabor Mfg. Co., Phila.

CUTTING-OFF MACHINES—Cold Saw
Espen-Lucas Mch. Wks., Philadelphia.

CUTTING-OFF MACHINES—Pipe or Tubing
Aetna-Standard Engineering Co., The, Youngstown, Ohio.
Bardons & Oliver, Cleveland.
Landis Mch. Co., Inc., Waynesboro, Pa.

CUTTING AND WELDING APPARATUS—Oxy-Acetylene—See Welding and Cutting Machines and Equipment—Oxy-Acetylene.

CYLINDERS — Compressed Air & Hydraulic
Hanna Engineering Works, 1761 Elston Ave., Chicago.
Tomkins-Johnson Co., The, Jackson, Mich.

CYLINDERS—Seamless
Harrisburg (Pa.) Steel Corp.
National Tube Co. (U. S. Steel Corp. Subsidiary), Pittsburgh.

DEGREASING COMPOUNDS
Pennsylvania Salt Mfg. Co., Philadelphia, Pa.

DEGREASING MACHINES—Solvent
Detroit Rex Products Co., Detroit, Mich.

DEOXIDIZERS
Vanadium Corp. of America, 420 Lexington Ave., N. Y. C.

DICTATING MACHINES
Dictaphone Sales Corp., 420 Lexington Ave., New York City.

DIE-FILING MACHINES
Continental Machine Specialties, Inc., Minneapolis, Minn.

DIE SETS
U. S. Tool Co., Inc., Ampere, N. J.

DIE SINKING MACHINES — Automatic and Hand
Cincinnati (Ohio) Milling Mch. Co., The.
Pratt & Whitney Div., Niles-Bement-Pond Co., Hartford, Conn.

DIEING MACHINES—Automatic
Henry & Wright Mfg. Co., The, Hartford, Conn.

DIES—Cast Tool Steel
Forging & Casting Corp., The, Ferndale, Mich.

DIES, JIGS, FIXTURES, etc.
Atlantic Mfg. Co., Philadelphia.
Taft-Peirce Mfg. Co.,The,Woonsocket,R. I.

DIES—Pipe Threading
Landis Mch. Co., Inc., Waynesboro, Pa.
Murchey Machine & Tool Co., Detroit.

DIES—Screw and Thread Cutting
Eastern Mach. Screw Corp., New Haven, Ct.
Greenfield (Mass.) Tap & Die Corp.
Jones & Lamson Mch. Co., Springfield, Vt.
Landis Mch. Co., Inc., Waynesboro, Pa.
Murchey Machine & Tool Co., Detroit.

DIES—Self-Opening Adjustable
Eastern Mach. Screw Corp., New Haven, Ct.
Jones & Lamson Mch. Co., Springfield, Vt.
Landis Mch. Co., Inc., Waynesboro, Pa.
Murchey Machine & Tool Co., Detroit.
National Acme Co., The, Cleveland.

DIES—Sheet Metal Working
Worcester (Mass.) Stamped Metal Co.

DIES—Steel Letters and Stamps
Cunningham, M. E., Co., Pittsburgh.
Noble & Westbrook Mfg. Co., The, East Hartford, Ct.

DOORS & SHUTTERS, Fireproof
Kinnear Mfg. Co., Columbus, Ohio.

DOORS & SHUTTERS—Steel or Wood Rolling
Kinnear Mfg. Co., Columbus, Ohio.

DRAWN WORK—Metal—See Stampings or Drawings—Metal

DRILL FILING SYSTEMS
Huot Mfg. Co., 500 Robert St., St. Paul, Minn.

DRILL HEADS—Hydraulic
National Automatic Tool Co.,Richmond,Ind.

DRILL HEADS—Multiple
Baker Bros., Inc., Toledo, Ohio.
Ex-Cell-O Corp., 1200 Oakman Blvd., Detroit.

DRILL INDEX
Huot Mfg. Co., 500 Robert St., St. Paul, Minn.

DRILLING MACHINES—Bench
Leland-Gifford Co., Worcester, Mass.

DRILLING MACHINES—Heavy Duty
Baker Bros., Inc., Toledo, Ohio.

DRILLING MACHINES—Multiple Spindle
Baker Bros., Inc., Toledo, Ohio.
Henry & Wright Mfg. Co., The, Hartford Conn.
National Automatic Tool Co., Richmond Ind.

DRILLING MACHINES—Multiple Spindle Adjustable
National Automatic Tool Co., Richmond, Ind.

DRILLING MACHINES—Multiple Spindle Horizontal
Baker Bros., Inc., Toledo, Ohio.
National Automatic Tool Co., Richmond, Ind.

DRILLING MACHINES—Portable Electric
Black & Decker Mfg. Co., The, Towson, Md.
Wodack Electric Tool Corp., Chicago.

DRILLING MACHINES—Portable Pneumatic
Cleveland (Ohio) Pneumatic Tool Co., The.
Helwig Mfg. Co., St. Paul, Minn.
Ingersoll-Rand Co., 11 Broadway, New York City.
Warner & Swasey Co., The, Cleveland.

DRILLING MACHINES—Radial
Cincinnati (Ohio) Bickford Tool Co., The.

DRILLING MACHINES—Sensitive
Leland-Gifford Co., Worcester, Mass.

DRILLING MACHINES—Upright
Baker Bros., Inc., Toledo, Ohio.
Cincinnati (Ohio) Bickford Tool Co., The.

DRILLING MACHINES—Vertical
Baker Bros., Inc., Toledo, Ohio.
Cincinnati (Ohio) Bickford Tool Co., The.

DRIVES—Gear
Farrel-Birmingham Co., Inc.,Buffalo,N.Y.
Mesta Mch. Co., Pittsburgh.

DRIVES—Single & Multiple V-Belts
Allis Chalmers Mfg. Co., Milwaukee.

DROP FORGINGS—See Forgings—Drop, Iron or Steel

DROP HAMMERS—See Hammers—Drop

DUST COLLECTORS
Abrasive Machine Tool Co., East Providence, R. I.
American Air Filter Co., Inc., Louisville, Ky.
American Blower Corp., 6000 Russell St., Detroit.
American Foundry Equipment Co., The, 401 Bykrit St., Mishawaka, Ind.
Blaw-Knox Co., Pittsburgh.
Pangborn Corporation, Hagerstown, Md.
Whiting Corp., Harvey, Ill.

ECONOMIZERS
Babcock & Wilcox Co., The, 85 Liberty St., New York City.

ELECTRIC HEATING ELEMENTS
Globar Div., The Carborundum Co., Niagara Falls, N. Y.

ELECTRIC LIGHTING—Industrial
General Electric Co., Cleveland.
General Electric Vapor Lamp Co., Hoboken, N. J.

ELECTRIC WELDING — See Welding — Electric

ELECTRICAL EQUIPMENT
Allis-Chalmers Mfg. Co., Milwaukee.
General Electric Co., Schenectady, N. Y.

ELECTRICAL MACHINERY — Second Hand. (See Clearing House Section)

ELECTRICAL WIRES
Roebling's, John A., Sons Co., Trenton, N. J.

ELECTRODE HOLDERS—Welding
Lincoln Electric Co., The, Cleveland.

ELECTRODES—Resistance Welding
Electroloy Co., Inc., 50 Church St., New York City.

ELECTRODES—Welding, Coated
Electric Arc Cutting & Welding Co., The, Newark, N. J.
Harnischfeger Corp., 4401 W. National Ave., Milwaukee.
Lincoln Electric Co., The, Cleveland.
Maurath, Inc., 7400 Union Ave., Cleveland.
Una Welding, Inc., Cleveland, Ohio.

ELECTROPLATING EQUIPMENT & SUPPLIES
Udylite Co., The, Detroit.

ELEVATORS—Portable
Barrett-Cravens Co., Chicago, Ill.
Lewis-Shepard Co., 122 Walnut St., Watertown Station, Boston.

ELEVATORS—Steam Hydraulic
Ridgway, Craig, & Son Co., Coatesville, Pa.

EMERY WHEELS—See Grinding Wheels

ENGINEERS & CONTRACTORS
Ferguson, H. K., Co., The, Cleveland.

ENGINEERS—Consulting and Industrial
Koppers Co., Pittsburgh.

ENGINES—Diesel
Ingersoll-Rand Co., 11 Broadway, N. Y. C.
Worthington Pump & Machinery Corp., Harrison, N. J.

ENGINES—Gas
Fairbanks, Morse & Co., Chicago.
Worthington Pump & Machinery Corp., Harrison, N. J.

ENGINES—Oil
Worthington Pump & Machinery Corp., Harrison, N. J.

EYELET MACHINES
Manville, E. J., Mch. Co., Waterbury, Ct.
Waterbury (Conn.) Farrel Foundry & Machine Co., The.

FACING CLAY
Carborundum Co., The, Perth Amboy, N.J.

FACTORY & PLANT SITES
Zoll, Edward H., 196 Market St., Newark, N. J.

FANS—Ventilating
American Blower Corp., 6000 Russell St., Detroit.
DeVilbiss Co., The, Toledo, Ohio.

FEED WATER HEATERS AND PURIFIERS
Harrisburg (Pa.) Steel Corp.

FEEDS—Hydraulic, for Machines
American Engineering Co., Philadelphia.
Oilgear Co., The, 1311 W. Bruce St., Milwaukee.

FELT—Wool Mechanical
American Felt Co.,315 Fourth Ave.,N.Y.C.

Products Index

FENCING—Wire
Pittsburgh (Pa.) Steel Co.

FERROALLOYS
Climax Molybdenum Co., 500 Fifth Ave., N. Y. C.
Electro Metallurgical Sales Corp., 30 E. 42nd St., N. Y. C.
Ohio Ferro-Alloys Corp., Canton, Ohio.
Pittsburgh Metallurgical Co., Inc., Niagara Falls, N. Y.
Titanium Alloy Mfg. Co., The, Niagara Falls, N. Y.
Vanadium Corp. of America, 420 Lexington Ave., N. Y. C.

FERROCHROME
Electro Metallurgical Sales Corp., 30 E. 42nd St., N. Y. C.
Ohio Ferro-Alloys Corp., Canton, Ohio.
Pittsburgh Metallurgical Co., Inc., Niagara Falls, N. Y.
Samuel, Frank, & Co., Inc., Philadelphia.
Vanadium Corp. of America, 420 Lexington Ave., N. Y. C.

FERROMANGANESE
Electro Metallurgical Sales Corp., 30 E. 42nd St., N. Y. C.
Ohio Ferro-Alloys Corp., Canton, Ohio.
Pittsburgh Metallurgical Co., Inc., Niagara Falls, N. Y.
Samuel, Frank & Co., Inc., Philadelphia.

FERROMOLYBDENUM
Climax Molybdenum Co., 500 Fifth Ave., N. Y. C.
Vanadium Corp. of America, 420 Lexington Ave., N. Y. C.

FERROSILICO MANGANESE
Ohio Ferro-Alloys Corp., Canton, Ohio.
Pittsburgh Metallurgical Co., Inc., Niagara Falls, N. Y.
Vanadium Corp. of America, 420 Lexington Ave., N. Y. C.

FERROSILICON
Electro Metallurgical Sales Corp., 30 E. 42nd St., N. Y. C.
Ohio Ferro-Alloys Corp., Canton, Ohio.
Pittsburgh Metallurgical Co., Inc., Niagara Falls, N. Y.
Samuel, Frank, & Co., Inc., Philadelphia.
Vanadium Corp. of America, 420 Lexington Ave., N. Y. C.

FERROSILICON ALUMINUM
Vanadium Corp. of America, 420 Lexington Ave., N. Y. C.

FERROSPIEGELEISEN
New Jersey Zinc Co., The, 160 Front St., N. Y. C.

FERROTITANIUM
Titanium Alloys Mfg. Co., The, Niagara Falls, N. Y.
Vanadium Corp. of America, 420 Lexington Ave., N. Y. C.

FERROVANADIUM
Electro Metallurgical Sales Corp., 30 E 42nd St., N. Y. C.
Vanadium Corp. of America, 420 Lexington Ave., N. Y. C.

FILES & RASPS
Disston, Henry, & Sons, Inc., Philadelphia.
Nicholson File Co., Providence, R. I.

FILING MACHINES
Continental Machine Specialties, Inc., Minneapolis, Minn.

FILTER CLOTH—Asbestos
Johns-Manville Corp., 22 East 40th St., New York City.

FILTERS—Air
American Air Filter Co., Inc., Louisville, Ky.

FILTERS—OIL
National Acme Co., The, Cleveland.

FILTERS—Pressure or Gravity
Scaife, Wm. B., & Sons Co., Pittsburgh.

FIRE BRICK—Insulating
Babcock & Wilcox Co., The, 85 Liberty St., New York City.
Quigley Co., Inc., 56 West 45th St., N. Y. C.

FIRE CLAY
Carborundum Co., The, Perth Amboy, N. J.
Illinois Clay Products Co., Joliet, Ill.
Keagler Brick Co., Steubenville, Ohio.
West Virginia Fire Clay Mfg. Co., Pittsburgh.

FITTINGS—Brass, Pipe and Tube
Commonwealth Brass Corp., Detroit.

FIXTURES—For Machine Tools
Knu-Vise Products Co., Detroit, Mich.

FLANGES—Forged Steel
Harrisburg (Pa.) Steel Corp.
Standard Steel Wks. Co., Burnham, Pa.

FLANGING WORK—Carbon and Alloy
Worth Steel Co., Claymont, Del.

FLEXIBLE SHAFT EQUIPMENT
Loveioy Flexible Coupling Co., Chicago.
Strand, N. A., & Co., Chicago.

FLOODLIGHTS—Acetylene
Linde Air Products Company, The, 30 East 42nd St., N. Y. C.

FLOOR ARMORING
Acme Steel Co., Chicago, Ill.

FLOOR (CONCRETE) REPAIR MATERIALS
Flexrock Co., 892 N. Delaware Ave., Phila., Pa.

FLOOR PLATES—See Plates—Floor or Cellar Door

FLOORING—Acid Proof
Nukem Products Corp., 68 Niagara St., Buffalo, N. Y.

FLOORING—Monolithic
Johns-Manville Corp., 22 East 40th St., New York City.

FLOORING—Open Steel
Blaw-Knox Co., Pittsburgh.
Dravo Corp., Pittsburgh.
Hendrick Mfg. Co., Carbondale, Pa.

FLOORING—Steel
American Pressed Steel Co., Phila., Pa.

FLUX—Welding
Linde Air Products Company, The, 30 East 42nd St., N. Y. C.

FORGING MACHINES—Roll
Ajax Mfg. Co., The, Euclid, Ohio.

FORGING MACHINES—Upset
Acme Machinery Co., Cleveland.
Ajax Mfg. Co., The, Euclid, Ohio.

FORGINGS—Alloy Steel
National Forge & Ordnance Co., Irvine, Pa.

FORGINGS—Aluminum
Aluminum Co. of America, Pittsburgh.

FORGINGS—Brass, Bronze or Copper
American Brass Co., The, Waterbury, Conn.
Commonwealth Brass Corp., Detroit.
Revere Copper & Brass, Inc., 230 Park Ave., N. Y. C.
Transue & Williams Steel Forging Corp., Alliance, Ohio.

FORGINGS—Coin Pressed
Rockford (Ill.) Drop Forge Co.

FORGINGS—Drop, Iron or Steel
Atlas Drop Forge Co., Lansing, Mich.
Bay City Forge Co., Erie, Pa.
Billings & Spencer Co., Hartford, Conn.
Canton (Ohio) Drop Forging & Mfg. Co.
Carnegie-Illinois Steel Corp. (U. S. Steel Corp. Subsidiary), Pittsburgh & Chicago.
Forging & Casting Corp., The, Ferndale, Mich.
Poor & Co., Canton Forge & Axle Wks., Canton, Ohio
Rockford (Ill.) Drop Forge Co.
Storms Drop Forging Co., Springfield, Mass.
Transue & Williams Steel Forging Corp., Alliance, Ohio.
Williams, J. H., & Co., Buffalo, N. Y.

FORGINGS—Hollow
Harrisburg (Pa.) Steel Corp.
National Forge & Ordnance Co., Irvine, Pa.

FORGINGS—Hollow Bored
American Hollow Boring Co., 1912 Raspberry St., Erie, Pa.

FORGINGS—Hydraulic Press, Iron or Steel
Atlas Drop Forge Co., Lansing, Mich.
Bethlehem (Pa.) Steel Company.
Mesta Mch. Co., Pittsburgh.
Midvale Co., The, Nicetown, Phila., Pa.
National Forge & Ordnance Co., Irvine, Pa.
Standard Steel Wks. Co., Burnham, Pa.

FORGINGS—Magnesium Alloys
Dow Chemical Co., The, 921 Jefferson Ave., Midland, Mich.

FORGINGS—Upset
Bethlehem (Pa.) Steel Company.
Lamson & Sessions Co., The, Cleveland.
Rockford (Ill.) Drop Forge Co.

FORMING AND COILING MACHINES
Peck, Stow & Wilcox Co., The, Southington, Conn.

FOUNDRY EQUIPMENT & SUPPLIES
Whiting Corp., Harvey, Ill.

FURNACE ENGINEERS
Electric Furnace Co., The, Salem, Ohio.
Flinn & Dreffein Co., Chicago.
Surface Combustion Corp., 2375 Dorr St., Toledo.
Wilson, Lee Engineering Co., The, Cleveland.

FURNACES—Annealing & Case Hardening
American Gas Furnace Co., Elizabeth, N. J.
Electric Furnace Co., The, Salem, Ohio.
Leeds & Northrup Co., Philadelphia.
Surface Combustion Corp., 2375 Dorr St., Toledo.
Wilson, Lee Engineering Co., The, Cleveland.

FURNACES—Billet or Ingot Heating
Flinn & Dreffein Co., Chicago.
Surface Combustion Corp., 2375 Dorr St., Toledo.

FURNACES—Brass Melting
Monarch Engineering & Mfg. Co., The, Baltimore, Md.

FURNACES—Electric, Steel Melting
American Bridge Co. (U. S. Steel Corp. Subsidiary), Pittsburgh.
General Electric Co., Schenectady, N. Y.
Pittsburgh (Pa.) Lectromelt Furnace Corp.

FURNACES—Enameling
Carborundum Co., The, Perth Amboy, N. J.
Electric Furnace Co., The, Salem, Ohio.
Surface Combustion Corp., 2375 Dorr St., Toledo.

FURNACES—Forging
Electric Furnace Co., The, Salem, Ohio.
Holcroft & Co., Detroit.
Surface Combustion Corp., 2375 Dorr St., Toledo.
Wilson, Lee Engineering Co., The, Cleveland.

FURNACES—Heat Treating, Automatic
Amer. Gas Furnace Co., Elizabeth, N. J.
Electric Furnace Co., The, Salem, Ohio.
Holcroft & Co., Detroit.
Leeds & Northrup Co., Philadelphia.
Rockwell, W. S., Co., 50 Church St., N.Y.C.
Surface Combustion Corp., 2375 Dorr St. Toledo.

FURNACES—Heat Treating, Cyanide of Lead
Chicago (Ill.) Flexible Shaft Co.
Electric Furnace Co., The, Salem, Ohio.
Surface Combustion Corp., 2375 Dorr St., Toledo.

FURNACES—Heat Treating, Electric
Electric Furnace Co., The, Salem, Ohio.
General Electric Co., Schenectady, N. Y.
Holcroft & Co., Detroit.

Products Index

Hoskins Mfg. Co., Detroit, Mich.
Leeds & Northrup Co., Philadelphia.
Maehler, Paul Co., The, Chicago.
Rockwell, W. S., Co., 50 Church St., N.Y.C
Westinghouse Electric & Mfg. Co., East Pittsburgh, Pa.

FURNACES—Heat Treating, Oil or Gas
Chicago (Ill.) Flexible Shaft Co.
Electric Furnace Co., The, Salem, Ohio.
Holcroft & Co., Detroit.
Maehler, Paul Co., The, Chicago.
Monarch Engineering & Mfg. Co., The, Baltimore, Md.
Rockwell, W. S., Co., 50 Church St., N.Y.C.
Surface Combustion Corp., 2375 Dorr St., Toledo.
Wilson, Lee Engineering Co., The, Cleveland.

FURNACES—Pack Heating Sheets
Aetna-Standard Engineering Co., The Youngstown, Ohio.
Wean Engineering Co., Inc., The, Warren, Ohio.

FURNACES—Rivet Heating, Electric
General Electric Co., Schenectady, N. Y.

FURNACES—Wire, Annealing and Galvanizing
General Electric Co., Schenectady, N. Y.
Surface Combustion Corp., 2375 Dorr St., Toledo.

GAGE BLOCKS
Ford Motor Co. (Johansson Division), Dearborn, Mich.
Pratt & Whitney Div. Niles-Bement-Pond Co., Hartford, Conn.

GAGES—Dial
Starrett, L. S., Co., Athol, Mass.

GAGES—Electric
Sheffield Gage Corp., Dayton, Ohio.

GAGES—Plug and Snap
Pratt & Whitney Div. Niles-Bement-Pond Co., Hartford, Conn.
Sheffield Gage Corp., Dayton, Ohio.
Taft-Peirce Mfg. Co., The, Woonsocket, R. I.

GAGES—Pressure & Vacuum Recording
Brown Instrument Co., The, Philadelphia, Pa.

GAGES—Temperature
Weston Electrical Instrument Corp., Newark, N. J.

GAGES—Thickness, for Rolling Mills
Haines Gauge Co., The, Phila., Pa.

GAGES—Thread Lead
Jones & Lamson Mch. Co., Springfield, Vt.
Pratt & Whitney Div. Niles-Bement-Pond Co., Hartford, Conn.
Sheffield Gage Corp., Dayton, Ohio.

GALVANIZING
Castle, Joseph P., & Bros., Phila.

GALVANIZING COMPOUNDS
Pennsylvania Salt Mfg. Co., Philadelphia, Pa.

GALVANIZING PLANTS—For Sheets
Aetna-Standard Engineering Co., The, Youngstown, Ohio.
Erie (Pa.) Foundry Co.

GAS ANALYSIS RECORDERS
Brown Instrument Co., The, Philadelphia, Pa.
Leeds & Northrup Co., Philadelphia.

GAS FOR INDUSTRIAL USES
American Gas Association, 420 Lexington Ave., N. Y. C.

GAS PRODUCERS
Flinn & Dreffein Co., Chicago.
Koppers Co., Pittsburgh.
Morgan Construction Co., Worcester, Mass.
Wood, R. D., & Co., Philadelphia.

GAS RECOVERY COKE OVENS
Koppers Co., Pittsburgh.

GASKETS—Asbestos, Metal or Rubber
Garlock Packing Co., The, Palmyra, N. Y.
Johns-Manville Corp., 22 East 40th St., New York City.

GASKETS—Rubber
Goodrich, B. F., Co., The, Akron, Ohio.

GEAR CUTTING
Earle Gear & Machine Co., Phila.
Farrel-Birmingham Co., Inc., Buffalo, N.Y.
Gleason Works, Rochester, N. Y.
James, D. O., Mfg. Co., Chicago.
Jones, W. A., Fdry. & Mch. Co., 4401 Roosevelt Rd., Chicago.
Philadelphia (Pa.) Gear Works.
Taylor-Wilson Mfg. Co., McKees Rocks, Pa.

GEAR CUTTING MACHINES
Farrel-Birmingham Co., Inc., Buffalo, N.Y.
Gleason Works, Rochester, N. Y.

GEAR DRIVES—Herringbone
Jones, W. A., Fdry. & Mch. Co., 4401 Roosevelt Rd., Chicago.
Lewis Foundry & Mch. Co., Pittsburgh.
United Engineering & Fdry. Co., Pgh.

GEARMOTORS
Allis-Chalmers Mfg. Co., Milwaukee.
James, D. O., Mfg. Co., Chicago.
Reliance Electric & Eneng. Co., Cleveland.
Westinghouse Elec. & Mfg. Co., East Pgh.

GEAR PLANNING MACHINES
Gleason Works, Rochester, N. Y.

GEARS—Bevel
Boston Gear Wks., Inc., North Quincy, Mass.
Gleason Works, Rochester, N. Y.
James, D. O., Mfg. Co., Chicago.
Richardson Co., The, Melrose Park, Ill.

GEARS—Heat Treated
Gleason Works, Rochester, N. Y.
James, D. O., Mfg. Co., Chicago.
Jones, W. A., Fdry. & Mch. Co., 4401 Roosevelt Rd., Chicago.
Simonds Mfg. Co., Pittsburgh.

GEARS—Herringbone
Farrel-Birmingham Co., Inc., Buffalo, N.Y.
Horsburgh & Scott Co., 5112 Hamilton Ave., Cleveland.
James, D. O., Mfg. Co., Chicago.
Jones, W. A., Fdry. & Mch. Co., 4401 Roosevelt Rd., Chicago.
Mesta Mch. Co., Pittsburgh.
Philadelphia (Pa.) Gear Works.

GEARS—Machine Cut
Boston Gear Wks., Inc., North Quincy, Mass.
Cleveland (Ohio) Worm & Gear Co.
Gleason Works, Rochester, N. Y.
James, D. O., Mfg. Co., Chicago.
Jones, W. A., Fdry. & Mch. Co., 4401 Roosevelt Rd., Chicago.
Simonds Mfg. Co., Pittsburgh.

GEARS—Machine Molded
Poole Foundry & Mch. Co., Baltimore, Md.

GEARS—Non-Metallic
Boston Gear Wks., Inc., North Quincy, Mass.
Chicago (Ill.) Rawhide Mfg. Co., The, 1306 Elston Ave.
General Electric Co., Schenectady, N. Y.
James, D. O., Mfg. Co., Chicago.

GEARS—Rawhide
Chicago (Ill.) Rawhide Mfg. Co., The, 1306 Elston Ave.

GEARS—Steel, Silent
Waldron, John, Corp., New Brunswick, N. J.

GEARS—Spur
Boston Gear Wks., Inc., North Quincy, Mass.
James, D. O., Mfg. Co., Chicago.
Jones, W. A., Fdry. & Mch. Co., 4401 Roosevelt Rd., Chicago.
Philadelphia (Pa.) Gear Works.
Simonds Mfg. Co., Pittsburgh.

GEARS—Worm
Boston Gear Wks., Inc., North Quincy, Mass.
Cleveland (Ohio) Worm & Gear Co.
Horsburgh & Scott Co., 5112 Hamilton Ave., Cleveland.
James, D. O., Mfg. Co., Chicago.
Jones, W. A., Fdry. & Mch. Co., 4401 Roosevelt Rd., Chicago.
Philadelphia (Pa.) Gear Works.

GENERATORS—Acetylene
Air Reduction Sales Co., 60 East 42nd St., N. Y. C.
Linde Air Products Company, The, 30 East 42nd St., N. Y. C.

GENERATORS—Electric
Fairbanks, Morse & Co., Chicago.
Lincoln Electric Co., The, Cleveland.
Reliance Electric & Engng. Co., Cleveland.
Westinghouse Elec. & Mfg. Co., East Pgh.

GENERATORS—Electric, Second Hand. (See Clearing House Section)

GLOVES—Asbestos & Fireproof
Safety Equipment Service Co., Cleveland.

GOGGLES—Safety
American Optical Co., Southbridge, Mass.
Safety Equipment Service Co., Cleveland.

GOVERNORS—Air Compressor
Westinghouse Air Brake Co., Industrial Div., Pittsburgh.

GRABS—For Sheets and Coils
J-B Engineering Sales Co., 1738 Orange St., New Haven, Conn.

GRATING—Flooring, Sidewalk, etc.—See Flooring—Open Steel

GREASE—Lubricating
Gulf Oil Corp., Gulf Refining Co., Pittsburgh.
Shell's Industrial Lubricants Div., Shell Bldg., San Francisco, Shell Bldg., St. Louis, & 50 W. 50th St., N. Y. C.
Socony-Vacuum Oil Co., Inc., 26 Broadway, N. Y. C.
Standard Oil Co. (Indiana), Chicago.
Sun Oil Co., Philadelphia.
Tide Water Associated Oil Co., 17 Battery Place, N. Y. C.

GRILLES—Metal Cane
Diamond Mfg. Co., Wyoming, Pa.

GRILLES—Perforated Metal
Erdle Perforating Co., Rochester, N. Y.
Harrington & King Perforated Co., Chicago.

GRINDING AND POLISHING MACHINES
Black & Decker Mfg. Co., The, Towson, Md.
Excelsior Tool & Mch. Co., E. St. Louis, Ill.
Norton Co., Worcester, Mass.
Production Machine Co., Greenfield, Mass.

GRINDING MACHINES—Belt
Production Machine Co., Greenfield, Mass.

GRINDING MACHINES—Broach
Thompson Grinder Co., Springfield, Ohio.

GRINDING MACHINES—Centerless
Cincinnati (Ohio) Grinders Incorporated.

GRINDING MACHINES—Cutter & Reamer
Cincinnati (Ohio) Milling Mch. Co., The.
Gallmeyer & Livingston Co., Grand Rapids, Mich.
Landis Tool Co., Waynesboro, Pa.

GRINDING MACHINES—Cylinder
Heald Mch. Co., Worcester, Mass.

GRINDING MACHINES—Cylindrical
Brown & Sharpe Mfg. Co., Providence, R.I.
Cincinnati (Ohio) Grinders Incorporated.
Landis Tool Co., Waynesboro, Pa.
Norton Co., Worcester, Mass.

GRINDING MACHINES—Die
Landis Mch. Co., Inc., Waynesboro, Pa.

GRINDING MACHINES—Drill
Gallmeyer & Livingston Co., Grand Rapids, Mich.

Products Index

GRINDING MACHINES—Gear & Worm
Pratt & Whitney Div. Niles-Bement-Pond Co., Hartford, Conn.

GRINDING MACHINES—Internal
Greenfield (Mass.) Tap & Die Corp.
Heald Mch. Co., Worcester, Mass.

GRINDING MACHINES—Internal Centerless
Heald Mch. Co., Worcester, Mass.

GRINDING MACHINES—Internal Multiple Spindle
Baird Mch. Co., The, Bridgeport, Conn.

GRINDING MACHINES—Portable Electric
Black & Decker Mfg. Co., The, Towson, Md.
Wodack Electrical Tool Corp., Chicago.

GRINDING MACHINES—Portable Flexible Shaft
Pratt & Whitney Div. Niles-Bement-Pond Co., Hartford, Conn.
Strand, N. A., & Co., Chicago.

GRINDING MACHINES—Portable Pneumatic
Cleveland (Ohio) Pneumatic Tool Co., The.
Ingersoll-Rand Co., 11 Broadway, New York City.
Warner & Swasey Co., The, Cleveland.

GRINDING MACHINES—Roll
Cincinnati (Ohio) Grinders Incorporated.
Farrel-Birmingham Co., Inc., Ansonia, Conn.
Landis Tool Co., Waynesboro, Pa.

GRINDING MACHINES—Snagging
Black & Decker Mfg. Co., The, Towson, Md.
Warner & Swasey Co., The, Cleveland.

GRINDING MACHINES—Surface
Abrasive Machine Tool Co., E. Prov., R. I.
Blanchard Machine Co., The, Cambridge, Mass.
Gallmeyer & Livingston Co., Grand Rapids, Mich.
Heald Mch. Co., Worcester, Mass.
Norton Co., Worcester, Mass.
Pratt & Whitney Div. Niles-Bement-Pond Co., Hartford, Conn.
Thompson Grinder Co., Springfield, Ohio.

GRINDING MACHINES—Swing Frame
Black & Decker Mfg. Co., The, Towson, Md.

GRINDING MACHINES—Tap
Gallmeyer & Livingston Co., Grand Rapids, Mich.

GRINDING MACHINES—Tool
Cincinnati (Ohio) Milling Mch. Co., The.
Gisholt Machine Co., Madison, Wis.
Landis Tool Co., Waynesboro, Pa.
LeBlond, R. K., Mch. Tool Co., Cincinnati.
Norton Co., Worcester, Mass.

GRINDING MACHINES—Universal
Cincinnati (Ohio) Grinders Incorporated.
Landis Tool Co., Waynesboro, Pa.
Norton Co., Worcester, Mass.
Thompson Grinder Co., Springfield, Ohio.

GRINDING MACHINES—Valve
Landis Tool Co., Waynesboro, Pa.

GRINDING WHEELS
Bakelite Corp., 247 Park Ave., N. Y. C.
Blanchard Machine Co., The, Cambridge, Mass.
Carborundum Co., The, Niagara Falls, N.Y.
Macklin Co., Jackson, Mich.
Manhattan Rubber Mfg. Div. of Raybestos-Manhattan, Inc., The, 2 Townsend St., Passaic, N. J.
Norton Co., Worcester, Mass.

GRINDING WHEELS—Segment
Blanchard Machine Co., The, Cambridge, Mass.

GRIT—Steel
Pittsburgh (Pa.) Crushed Steel Co.

HACK SAW BLADES—See Saws—Hack Saw Blades

HACK SAW MACHINES
Armstrong-Blum Mfg. Co., Chicago.
Peerless Mch. Co., Racine, Wis.

HAMMER BOARDS
Irwin, H. G., Lumber Co., 1129 State St., Erie, Pa.

HAMMERS—Air, Forging
Nazel Engineering & Machine Works, Philadelphia.

HAMMERS—Chipping & Riveting—Pneumatic
Cleveland (Ohio) Pneumatic Tool Co., The.
Ingersoll-Rand Co., 11 Broadway, New York City.

HAMMERS—Drop
Billings & Spencer Co., Hartford, Conn.
Chambersburg (Pa.) Engineering Co.
Erie (Pa.) Foundry Co.
Morgan Engineering Co., The, Alliance, O.
Standard Machinery Co., Providence, R. I.

HAMMERS—Helve
Bradley, C. C., & Son, Inc., Syracuse, N. Y.

HAMMERS—Pneumatic
Cleveland (Ohio) Pneumatic Tool Co., The.
Ingersoll-Rand Co., 11 Broadway, New York City.

HAMMERS—Portable Electric
Black & Decker Mfg. Co., The, Towson, Md.
Wodack Electric Tool Corp., Chicago.

HAMMERS—Power
Bradley, C. C., & Son, Inc., Syracuse, N. Y.
Chambersburg (Pa.) Engineering Co.

HAMMERS—Rawhide
Chicago (Ill.) Rawhide Mfg. Co., 1306 Elson Ave.

HAMMERS—Steam
Chambersburg (Pa.) Engineering Co.
Erie (Pa.) Foundry Co.
Morgan Engineering Co., The, Alliance, O.

HANGERS—Ball Bearing
S K F Industries, Inc., Front St. & Erie Ave., Phila., Pa.

HANGERS—Roller Bearing
Hyatt Bearings Div., General Motors Corp., Newark, N. J.

HEADING MACHINES
Ajax Mfg. Co., The, Euclid, Ohio.
Manville, E. J., Mch. Co., Waterbury, Ct.
Waterbury (Conn.) Farrel Foundry & Machine Co., The.

HEADS—Spun and Pressed
Central Iron & Steel Co., Harrisburg, Pa.
Worth Steel Co., Claymont, Del.

HEADS—Steel—Flanged & Dished
Central Iron & Steel Co., Harrisburg, Pa.

HEAT RESISTING PRODUCTS—Electric
Globar Div., The Carborundum Co., Niagara Falls, N. Y.
Holden, A. F., Co., New Haven, Conn.

HEAT TREATING
Barnes-Gibson-Raymond, Detroit Plant, Div. of Associated Spring Corp.
Barnes, Wallace Co., The, Div. of Associated Spring Corp., Bristol, Conn.
General Machine Wks., York, Pa.
Gibson, Wm. D., Co., Div. of Associated Spring Corp., Chicago.
Holden, A. F., Co., New Haven, Conn.
Parish Pressed Steel Co., Reading, Pa.

HEAT TREATING COMPOUNDS
Holden, A. F., Co., New Haven, Conn.

HEAT TREATING EQUIPMENT—Air Draw
Holden, A. F., Co., New Haven, Conn.
Machler, Paul Co., The, Chicago.
Surface Combustion Corp., 2375 Dorr St., Toledo.

HEATERS—Unit
Dravo Corp., Pittsburgh.

HEATING RESISTANCE—Non-Metallic
Globar Div., The Carborundum Co., Niagara Falls, N. Y.
Holden, A. F., Co., New Haven, Conn.

HOISTS—Air
Curtis Pneumatic Machinery Co., 1948 Kienlen Ave., St. Louis, Mo.
Detroit (Mich.) Hoist & Mach. Co.
Hanna Engineering Works, 1761 Elston Ave., Chicago.
Ingersoll-Rand Co., 11 Broadway, N. Y. C.
Northern Engineering Works, Detroit.
Ridgway, Craig & Son Co., Coatesville, Pa.

HOISTS—Chain
Wright Mfg. Div., American Chain & Cable Co., Inc., York, Pa.
Yale & Towne Mfg. Co., The, Phila. Div., Phila., Pa.

HOISTS—Electric
American Engineering Co., Philadelphia.
Detroit (Mich.) Hoist & Mach. Co.
Euclid Crane & Hoist Co., The, Euclid, O.
Harnischfeger Corp., 4401 W. National Ave., Milwaukee, Wis.
Maris Brothers, Inc., Philadelphia.
Northern Engineering Works, Detroit, Mich.
Philadelphia (Pa.) Gear Works.
Robbins & Myers, Inc., Springfield, Ohio.
Shaw-Box Crane & Hoist Div. Manning, Maxwell & Moore, Inc., 402 Broadway, Muskegon, Mich.
Shepard Niles Crane & Hoist Corp., Montour Falls, N. Y.
Wright Mfg. Div., American Chain & Cable Co., Inc., York, Pa.
Yale & Towne Mfg. Co., The, Phila. Div., Phila., Pa.

HOISTS—Electric Traveling
American Monorail Co., The, Cleveland.
Cleveland Tramrail Div. of The Cleveland Crane & Engng. Co., Wickliffe, Ohio.
Euclid Crane & Hoist Co., The, Euclid, O.
Northern Engineering Works, Detroit.
Shaw-Box Crane & Hoist Div. Manning, Maxwell & Moore, Inc., 402 Broadway, Muskegon, Mich.

HOISTS—Monorail
Cleveland Tramrail Div. of The Cleveland Crane & Engng. Co., Wickliffe, Ohio.
Euclid Crane & Hoist Co., The, Euclid, O.
Northern Engineering Works, Detroit.
Shaw-Box Crane & Hoist Div. Manning, Maxwell & Moore, Inc., 402 Broadway, Muskegon, Mich.
Shepard Niles Crane & Hoist Corp., Montour Falls, N. Y.

HOISTS—Scraper
Sullivan Machinery Co., Claremont, N. H.

HOSE—Air, Oil, Steam and Water
Pennsylvania Flexible Metallic Tubing Co., Philadelphia.

HOSE—Flexible Metallic
American Brass Co., The, Waterbury, Conn.
Pennsylvania Flexible Metallic Tubing Co., Philadelphia.

HOSE—Rubber
Goodrich, B. F., Co., The, Akron, Ohio.
Goodyear Tire & Rubber Co., Akron, Ohio.
Manhattan Rubber Mfg. Div. of Raybestos-Manhattan, Inc., The, 2 Townsend St., Passaic, N. J.

HYDRANTS—Fire
Wood, R. D., & Co., Philadelphia.

HYDRAULIC MACHINERY
Baldwin-Southwark Corp., Southwark Div., Philadelphia.
Birdsboro (Pa.) Steel Foundry & Machine Co.
Chambersburg (Pa.) Engineering Co.
Elmes, Chas. F., Engng. Wks., Chicago.
Farquhar, A. B., Co., Ltd., York, Pa.
Hydraulik Gmbh, Duisburg, Germany.
Lake Erie Engineering Corp., 68 Kenmore Sta., Buffalo, N. Y.
Morgan Engineering Co., The, Alliance, O.
Wood, R. D., & Co., Philadelphia.

INGOT MOLDS
Shenango Furnace Co., Pittsburgh.
Shenango-Penn Mold Co., Pittsburgh.
Snyder, W. P., & Co., Pittsburgh.
Valley Mould & Iron Corp., Hubbard, Ohio.

Products Index

INGOTS—Aluminum
Aluminum Co. of America, Pittsburgh.
Seligman, Arthur, & Co., Inc., 30 Rockefeller Plaza, R. C. A. Bldg., N. Y. C.

INGOTS—Phosphor Bronze
Phosphor Bronze Smelting Co., The, Phila.

INHIBITORS
American Chemical Paint Co., Ambler, Pa.
Du Pont de Nemours, E. I., & Co., Inc. Grasselli Chemicals Dept., Wilmington, Del.

INSTRUMENTS—Electric
Weston Electrical Instrument Corp., Newark, N. J.

INSTRUMENTS—Recording
Brown Instrument Co., The, Philadelphia, Pa.
Leeds & Northrup Co., Philadelphia.

INSULATION
Johns-Manville Corp., 22 East 40th St., New York City.

IRON—Rustless
Ludlum Steel Co., Watervliet, N. Y.

JIGS, FIXTURES, DIES, etc. (See Dies, Jigs, Fixtures, etc.)

KEYS—Riveted
Western Wire Prods. Co., St. Louis, Mo.

KEYSEATING MACHINES
Baker Bros., Inc., Toledo, Ohio.
Davis Keyseater Co., 400 Exchange St., Rochester, N. Y.

LACING—Belt, Rawhide or Leather
Chicago (Ill.) Rawhide Mfg. Co., The, 1306 Elston Ave.

LAGGING—Insulating
Quigley Co., Inc., 56 West 45th St., N. Y. C.

LAMPS—Filament
General Electric Co., Cleveland.

LAMPS—Mercury Vapor
General Electric Vapor Lamp Co., Hoboken, N. J.

LAPPING MACHINES
Cincinnati (Ohio) Grinders Incorporated.

LATHES—Automatic
Baird Mch. Co., The, Brideport, Conn.
Bullard Co., The, Bridgeport, Conn.
Gisholt Machine Co., Madison, Wis.
Goss & De Leeuw Mch. Co., New Britain, Conn.
Jones & Lamson Mch. Co., Springfield, Vt.
LeBlond, R. K., Mch. Tool Co., Cincinnatti.
Monarch Mch. Tool Co., The, Sidney, O.

LATHES—Automatic Vertical
Baird Mch. Co., The, Bridgeport, Conn.
Bullard Co., The, Bridgeport, Conn.
Gisholt Machine Co., Madison, Wis.

LATHES—Bench
Pratt & Whitney Div. Niles-Bement-Pond Co., Hartford, Conn.
Rivett Lathe & Grinder, Inc., Boston, Mass.
South Bend (Ind.) Lathe Works, 595 East Madison St.

LATHES—Brass
Warner & Swasey Co., The, Cleveland.

LATHES—Chucking
Jones & Lamson Mch. Co., Springfield, Vt.
Warner & Swasey Co., The, Cleveland.

LATHES—Contour Turning
Monarch Mch. Tool Co., The, Sidney, O.

LATHES—Crankshaft
LeBlond, R. K., Mch. Tool Co., Cincinnati.

LATHES—Engine
Hill-Clarke Mchry. Co., 647 W. Washington Blvd., Chicago.
LeBlond, R. K., Mch. Tool Co., Cincinnati.
Monarch Mch. Tool Co., The, Sidney, O.
Pratt & Whitney Div. Niles-Bement-Pond Co., Hartford, Conn.
South Bend (Ind.) Lathe Works, 595 East Madison St.

LATHES—Roll
Lewis Foundry & Mch. Co., Pittsburgh.
Mesta Mch. Co., Pittsburgh.
United Engineering & Fdry. Co., Ptgh.

LATHES — Second-Hand. (See Clearing House Section)

LATHES—Toolroom
LeBlond, R. K., Machine Tool Co., Cincinnati, Ohio.
Monarch Mch. Tool Co., The, Sidney, O.
Pratt & Whitney Div. Niles-Bement-Pond Co., Hartford, Conn.
South Bend (Ind.) Lathe Works, 595 East Madison St.

LATHES—Turret
Acme Machine Tool Co., Cincinnati.
Bardons & Oliver, Cleveland.
Bullard Co., The, Bridgeport, Conn.
Gisholt Machine Co., Madison, Wis.
Jones & Lamson Mch. Co., Springfield, Vt.
Warner & Swasey Co., The, Cleveland.

LATHES, Turret, Vertical
Bullard Co., The, Bridgeport, Conn.
Rogers Machine Wks., Alfred, New York.

LAYOUT FLUID
Dayton Rogers Mfg. Co., Minneapolis, Minn.

LEAD LININGS
Dietzel Lead Burning Co., Pittsburgh.
National Lead Co., 111 Bdway., N. Y. C.

LEAD—In Oil
National Lead Co., 111 Bdway., N. Y. C.

LEAD—Tellurium
National Lead Co., 111 Bdway., N. Y. C.

LEATHER—Cup
Chicago (Ill.) Rawhide Mfg. Co., The, 1306 Elston Ave.

LEGGINS—Safety
Safety Equipment Service Co., Cleveland.

LEVELING MACHINES
Aetna-Standard Engineering Co., The, Youngstown, Ohio.
Schatz Mfg. Co., The, Poughkeepsie, N. Y.
Wean Engineering Co., Inc., The, Warren, O.

LINING—Converter
Edge Hill Silica Rock Co., New Brunswick, New Jersey.

LOCK WASHER MACHINERY
Sleeper & Hartley, Inc., Worcester, Mass.

LOCOMOTIVES—Electric
Atlas Car & Mfg. Co., The, Cleveland.
Davenport (Iowa) Locomotives Works.
General Electric Co., Schenectady, N. Y.

LOCOMOTIVES—Gas-Electric
Davenport (Iowa) Locomotives Works.

LOCOMOTIVES—Industrial
Davenport (Iowa) Locomotives Works.

LOCOMOTIVES—Steam
Iron & Steel Products, Inc., Chicago.

LOCOMOTIVES—Storage Battery
Atlas Car & Mfg. Co., The, Cleveland.

LUBRICANTS—Crusher & Grinding
Gulf Oil Corp., Gulf Refining Co., Pittsburgh.
Shell's Industrial Lubricants Div., Shell Bldg., San Francisco; Shell Bldg., St. Louis, & 50 W. 50th St., N. Y. C.
Socony-Vacuum Oil Co., Inc., 26 Broadway, N. Y. C.
Sun Oil Co., Philadelphia.
Texas Company, The, 135 East 42nd St., N. Y. C.
Tide Water Associated Oil Co., 17 Battery Place, N. Y. C.

LUBRICANTS—Gear
Gulf Oil Corp., Gulf Refining Co., Pittsburgh.
Shell's Industrial Lubricants Div., Shell Bldg., San Francisco, Shell Bldg., St. Louis, & 50 W. 50th St., N. Y. C.
Socony-Vacuum Oil Co., Inc., 26 Broadway, N. Y. C.
Standard Oil Co. (Indiana), Chicago.
Sun Oil Co., Philadelphia.
Texas Company, The, 135 East 42nd St., N. Y. C.
Tide Water Associated Oil Co., 17 Battery Place, N. Y. C.

LUBRICANTS—High Pressure & Temperature
Gulf Oil Corp., Gulf Refining Co., Pittsburgh.
Shell's Industrial Lubricants Div., Shell Bldg., San Francisco, Shell Bldg., St. Louis, & 50 W. 50th St., N. Y. C.
Socony-Vacuum Oil Co., Inc., 26 Broadway, N. Y. C.
Standard Oil Co. (Indiana), Chicago.
Sun Oil Co., Philadelphia.
Texas Company, The, 135 East 42nd St., N. Y. C.
Tide Water Associated Oil Co., 17 Battery Place, N. Y. C.

LUBRICANTS—Mine Cars
Gulf Oil Corp., Gulf Refining Co., Pittsburgh.
Shell's Industrial Lubricants Div., Shell Bldg., San Francisco, Shell Bldg., St. Louis, & 50 W. 50th St., N. Y. C.
Socony-Vacuum Oil Co., Inc., 26 Broadway, N. Y. C.
Sun Oil Co., Philadelphia.
Texas Company, The, 135 East 42nd St., N. Y. C.
Tide Water Associated Oil Co., 17 Battery Place, N. Y. C.

LUBRICANTS—Mining Machines
Gulf Oil Corp., Gulf Refining Co., Pittsburgh.
Shell's Industrial Lubricants Div., Shell Bldg., San Francisco, Shell Bldg., St. Louis, & 50 W. 50th St., N. Y. C.
Socony-Vacuum Oil Co., Inc., 26 Broadway, N. Y. C.
Sun Oil Co., Philadelphia.
Texas Company, The, 135 East 42nd St., N. Y. C.
Tide Water Associated Oil Co., 17 Battery Place, N. Y. C.

LUBRICANTS—Railroad
Gulf Oil Corp., Gulf Refining Co., Pittsburgh.
Shell's Industrial Lubricants Div., Shell Bldg., San Francisco, Shell Bldg., St. Louis, & 50 W. 50th St., N. Y. C.
Socony-Vacuum Oil Co., Inc., 26 Broadway, N. Y. C.
Sun Oil Co., Philadelphia.
Texas Company, The, 135 East 42nd St., N. Y. C.
Tide Water Associated Oil Co., 17 Battery Place, N. Y. C.

LUBRICANTS—Roll Neck—Anti-Friction & Plain
Gulf Oil Corp., Gulf Refining Co., Pittsburgh.
Shell's Industrial Lubricants Div., Shell Bldg., San Francisco, Shell Bldg., St. Louis, & 50 W. 50th St., N. Y. C.
Socony-Vacuum Oil Co., Inc., 26 Broadway, N. Y. C.
Standard Oil Co. (Indiana), Chicago.
Sun Oil Co., Philadelphia.
Tide Water Associated Oil Co., 17 Battery Place, N. Y. C.

LUBRICANTS—Tipple & Cleaning
Gulf Oil Corp., Gulf Refining Co., Pittsburgh.
Shell's Industrial Lubricants Div., Shell Bldg., San Francisco; Shell Bldg., St. Louis, and 50 W. 50th St., N. Y. C.
Socony-Vacuum Oil Co., Inc., 26 Broadway, N. Y. C.
Sun Oil Co., Philadelphia.
Texas Company, The, 135 East 42nd St., N. Y. C.
Tide Water Associated Oil Co., 17 Battery Place, N. Y. C.

Products Index

Products Index

OVENS—Enameling and Japanning
Carborundum Co., The, Perth Amboy, N. J.
Herrington & Randall, Inc., Detroit.
Maehler, Paul Co., The, Chicago.
Surface Combustion Corp., 2375 Dorr St., Toledo.

OXY-ACETYLENE — Shape-Cutting Machines
Air Reduction Sales Co., 60 East 42nd St., N. Y. C.
Linde Air Products Company, The, 30 East 42nd St., N. Y. C.

OXYGEN
Air Reduction Sales Co., 60 East 42nd St., N. Y. C.
Linde Air Products Company, The, 30 East 42nd St., N. Y. C.

PACKING—Felt
American Felt Co., 315 Fourth Ave., N. Y. C.

PACKING—Hydraulic
Rhoads, J. E. & Sons, Philadelphia.

PACKING—Leather
Chicago (Ill.) Rawhide Mfg. Co., The, 1306 Elston Ave.
Rhoads, J. E., & Sons, Philadelphia.

PACKING—Metallic
Garlock Packing Co., The, Palmyra, N. Y.

PACKING—Rubber
Goodrich, B. F., Co., The, Akron, Ohio.
Goodyear Tire & Rubber Co., Akron, Ohio.
Manhattan Rubber Mfg. Div. of Raybestos-Manhattan, Inc., The, 2 Townsend St., Passaic, N. J.

PACKING—Sheet, Asbestos or Rubber
Garlock Packing Co., The, Palmyra, N. Y.
Johns-Manville Corp., 22 East 40th St., New York City.

PAINT
Midland Paint & Varnish Co., The, Cleveland.
National Lead Co., 111 Bdway., N. Y. C.

PAINT STICKS
Helmer & Staley, Inc., Chicago, Ill.

PERFORATED METAL
Chicago Perforating Co., 2440 W 24th Place, Chicago, Ill.
Diamond Mfg. Co., Wyoming, Pa.
Erdle Perforating Co., Rochester, N. Y.
Harrington & King Perforating Co., Chicago.
Hendrick Mfg. Co., Carbondale, Pa.
Mundt, Chas., & Sons, 59 Fairmount Ave., Jersey City, N. J.
Wickwire Spencer Steel Co., 41 East 42nd St., N. Y. C.

PHOSPHOR—Copper
Phosphor Bronze Smelting Co., The, Phila.

PICKLING COMPOUNDS
American Chemical Paint Co., Ambler, Pa.

PICKLING MACHINES
Aetna-Standard Engineering Co., The, Youngstown, Ohio.
Mesta Mch. Co., Pittsburgh.

PICKLING TANK LININGS
Ceilcote Co., The, Cleveland.
Keagler Brick Co., Steubenville, Ohio.
National Lead Co., 111 Bdway., N. Y. C.

PICKLING TANK STEAM JETS
Dietzel Lead Burning Co., Pittsburgh.
Durion Co., Inc., The, 438 N. Findlay St., Dayton, Ohio.

PIG IRON
Bethlehem (Pa.) Steel Co.
Brooke, E. & G., Iron Co., Birdsboro, Pa.
Carnegie-Illinois Steel Corp. (U. S. Steel Corp. Subsidiary), Pittsburgh & Chicago.
Cleveland-Cliffs Iron Co., The, Cleveland, Ohio.
Hanna Furnace Corp., The, Detroit, Mich.
Pickands Mather & Co., Cleveland.
Republic Steel Corp., Cleveland, Ohio.
Shenango Furnace Co., Pittsburgh.
Shenango-Penn Mold Co., Pittsburgh.
Superior Charcoal Iron Co., Grand Rapids, Mich.
Tennessee Coal, Iron & Railroad Co. (U. S. Steel Corp. Subsidiary), Birmingham, Ala.

PIG IRON—Charcoal
Superior Charcoal Iron Co., Grand Rapids, Mich.

PILING—Steel Pipe
National Tube Co. (U. S. Steel Corp. Subsidiary), Pittsburgh.

PILING—Steel Sheet
Carnegie-Illinois Steel Corp. (U. S. Steel Corp. Subsidiary), Pittsburgh & Chicago.
Jones & Laughlin Steel Corp., Pittsburgh.

PINIONS—Rolling Mill
Mesta Mch. Co., Pittsburgh.

PINIONS—Wire and Rod
Rathbone, A. R. & J., Palmer, Mass.

PINS—Cotter
Lamson & Sessions Co., The, Cleveland.

PIPE—Acid Resisting
Haveg Corporation, Newark, Delaware.

PIPE—Cast Iron, B. & S. and Flanged
Wood, R. D., & Co., Philadelphia.

PIPE—Hammer Welded
National Tube Co. (U. S. Steel Corp. Subsidiary), Pittsburgh.

PIPE—Lead
National Lead Co., 111 Bdway., N. Y. C.

PIPE—Lead Lined
National Lead Co., 111 Bdway., N. Y. C.

PIPE—New and Second-Hand
Albert & Davidson Pipe Corp., 2nd Ave., 50-51st St., Bklyn., N. Y.
Albert Pipe Supply Co., Inc., Berry and N. 13th St., Bklyn., N. Y.
Greenpoint Iron & Pipe Co., Inc., Stagg & Bogart Sts., Bklyn., N. Y.

PIPE—Seamless Brass or Copper
American Brass Co., The, Waterbury, Conn.
Revere Copper & Brass, Inc., 230 Park Ave., N. Y. C.

PIPE—Spiral Welded
American Rolling Mill Co., Middletown, O.
Crane Co., Chicago.

PIPE—Standard, Black and Galvanized
Bethlehem (Pa.) Steel Co.
Jones & Laughlin Steel Corp., Pittsburgh.
National Tube Co. (U. S. Steel Corp. Subsidiary), Pittsburgh.
Republic Steel Corp., Cleveland, Ohio.
Youngstown (Ohio) Sheet & Tube Co., The.

PIPE—Welded, Electric
National Tube Co. (U. S. Steel Corp. Subsidiary), Pittsburgh.
Republic Steel Corp., Cleveland, Ohio.

PIPE COVERING—Asbestos
Johns-Manville Corp., 22 East 40th St., New York City.

PIPE FITTINGS
Crane Co., Chicago.
Jarecki Mfg. Co., Erie, Pa.

PIPE THREADING & CUTTING MACHINES
Aetna-Standard Engineering Co., The, Youngstown, Ohio.
Jarecki Mfg. Co., Erie, Pa.
Landis, Mach. Co., Inc., Waynesboro, Pa.
Merrell Mfg. Co., Toledo.
Murchey Machine & Tool Co., Detroit.
Taylor-Wilson Mfg. Co., McKees Rocks, Pa.

PLANERS
Cincinnati (Ohio) Planer Co.

PLANING MACHINES — Second Hand. (See Clearing House Section)

PLASTICS—Laminated
Bakelite Corp., 247 Park Ave., N. Y. C.

PLASTICS — Laminated or Molded Phenolic
Richardson Co., The, Melrose Park, Ill.

PLASTICS—Molded
Bakelite Corp., 247 Park Ave., N. Y. C.

PLASTICS—Synthetic
Bakelite Corp., 247 Park Ave., N. Y. C.

PLATER'S CLEANING COMPOUND
American Chemical Paint Co., Ambler, Pa.

PLATES—Floor or Cellar Door
Alan Wood Steel Co., Conshohocken, Pa.
American Pressed Steel Co., Phila., Pa.
Carnegie-Illinois Steel Corp. (U. S. Steel Corp. Subsidiary), Pittsburgh & Chicago.
Central Iron & Steel Co., Harrisburg, Pa.
Inland Steel Co., Chicago.

PLATES—Iron or Steel
Alan Wood Steel Co., Conshohocken, Pa.
American Pressed Steel Co., Phila., Pa.
American Rolling Mill Co., Middletown, O.
Bethlehem (Pa.) Steel Company.
Carnegie-Illinois Steel Corp. (U. S. Steel Corp. Subsidiary), Pittsburgh & Chicago.
Central Iron & Steel Co., Harrisburg, Pa.
Granite City (Ill.) Steel Co.
Inland Steel Co., Chicago.
Jones & Laughlin Steel Corp., Pittsburgh.
Ryerson, Joseph T., & Son, Inc., Chicago.
Tennessee Coal, Iron & Railroad Co. (U. S. Steel Corp. Subsidiary), Birmingham, Ala.
Weirton (W. Va.) Steel Co.
Worth Steel Co., Claymont, Del.
Youngstown (Ohio) Sheet & Tube Co., The.

PLATFORMS—Skid
Lewis-Shepard Co., 122 Walnut St., Watertown Station, Boston.

PLUGS—Core Hole
Hubbard, M. D., Spring Co., 750 Central Ave., Pontiac, Mich.

POLISHING & BUFFING MACHINES—Automatic
Packer Machine Co., The, Meriden, Conn.

POLISHING MACHINES
Continental Machine Specialties, Inc., Minneapolis, Minn.
Packer Machine Co., The, Meriden, Conn.

POLISHING MACHINES—Bar
Medart Co., The, St. Louis, Mo.

POLISHING MACHINES—Belt
Production Machine Co., Greenfield, Mass.

POTS—Lead, Cyanide or Carbon
Electro Alloys Co., Elyria, Ohio.

POWER UNITS—Rotary
Cushman Chuck Co., Hartford, Conn.
New Departure Div., General Motors Corp., Bristol, Conn.

POWER UNITS—Straight Line
Cushman Chuck Co., Hartford, Conn.

PRECIPITATORS—Electrostatic Dust
Pangborn Corporation, Hagerstown, Md.

PRESS FEEDS—Automatic
Littell, F. J., Mch. Co., Chicago.

PRESSED METAL PARTS
Champion Sheet Metal Co., Inc., cor. Squires & Duane Sts., Cortland, N. Y.
Crosby Co., The, Buffalo, N. Y.
Stanley Works, The, New Britain, Conn.; Bridgeport, Conn.
Transue & Williams Steel Forging Corp., Alliance, Ohio.
Whitehead Stamping Co., 1669 W. Lafayette Blvd., Detroit, Mich.

PRESSED STEEL PARTS
Crosby Co., The, Buffalo, N. Y.
Lansing (Mich.) Stamping Co., So. Penn Ave.
Parish Pressed Steel Co., Reading, Pa.
Toledo (Ohio) Stamping & Mfg. Co.
Transue & Williams Steel Forging Corp., Alliance, Ohio.
Truscon Steel Co., Pressed Steel Div., Cleveland.

PRESSES—Automatic
Henry & Wright Mfg. Co., The, Hartford, Conn.
Niagara Mch. & Tool Wks., Buffalo, N. Y.
V & O Press Co., Hudson, N. Y.

Products Index

PRESSES—Baling
Galland-Henning Mfg. Co., Milwaukee.
PRESSES—Baling, Hydraulic
Baldwin-Southwark Corp., Southwark Div., Philadelphia.
Galland-Henning Mfg. Co., Milwaukee.
PRESSES—Coining
Zeh & Hahnemann Co., Newark, N. J.
PRESSES—Drop—See Hammers—Drop
PRESSES—Foot
Baird Mch. Co., The, Bridgeport, Conn.
Niagara Machine & Tool Works, Buffalo, N. Y.
Waterbury (Conn.) Farrel Foundry & Machine Co., The.
PRESSES—Forging
Ajax Mfg. Co., The, Euclid, Ohio.
Hydraulik Gmbh. Duisburg, Germany.
Mesta Mch. Co., Pittsburgh.
Morgan Engineering Co., The, Alliance, O.
PRESSES—Forming and Bending
Cincinnati (Ohio) Shaper Co., The.
Dreis & Krump Mfg. Co., Chicago.
Niagara Mch. & Tool Wks., Buffalo, N. Y.
U. S. Tool Co., Inc., Ampere, N. J.
PRESSES—Friction Screw
Schatz Mfg. Co., The, Poughkeepsie, N. Y.
Zeh & Hahnemann Co., Newark, N. J.
PRESSES—Hydraulic
Baldwin-Southwark Corp., Southwark Div., Philadelphia.
Birdsboro (Pa.) Steel Foundry & Machine Co.
Chambersburg (Pa.) Engineering Co.
Elmes, Chas. F., Engng. Wks., Chicago.
Farquhar, A. B., Co., Ltd., York, Pa.
Farrel-Birmingham Co., Inc., Ansonia, Conn.
Hannifin Mfg. Co., Chicago.
Hydraulik Gmbh. Duisburg, Germany.
Lake Erie Engineering Corp., 68 Kenmore Sta., Buffalo, N. Y.
Mesta Mch. Co., Pittsburgh.
Morgan Engineering Co., The, Alliance, O.
Oilgear Co., The, 1311 W. Bruce, Milwaukee.
Wood, R. D., & Co., Philadelphia.
PRESSES—Power
Baird Mch. Co., The, Bridgeport, Conn.
Cincinnati (Ohio) Shaper Co., The.
Dreis & Krump Mfg. Co., Chicago, Ill.
Farrel-Birmingham Co., Inc., Ansonia, Conn.
Hyman, Joseph, & Sons, Phila.
Manville, E. J., Mch. Co., Waterbury, Ct.
New Albany (Ind.) Mch. Mfg. Co.
Niagara Machine & Tool Wks., Buffalo, N.Y.
Peck, Stow & Wilcox Co., The, Southington, Conn.
Pels, Henry, & Co., Inc., 90 West St., N. Y. C.
Schatz Mfg. Co., The, Poughkeepsie, N. Y.
Standard Machinery Co., Providence, R. I.
U. S. Tool Co., Inc., Ampere, N. J.
V & O Press Co., Hudson, N. Y.
Waterbury (Ct.) Farrel Fdry. & Mch. Co., The.
Zeh & Hahnemann Co., Newark, N. J.
PRESSES—Trimming
Chambersburg (Pa.) Engineering Co.
Erie (Pa.) Foundry Co.
Niagara Mch. & Tool Wks., Buffalo, N. Y.
PULLEYS—Iron, Solid & Split
Falls Clutch & Mchry. Co., The, Cuyahoga Falls, Ohio.
Jones, W. A., Fdry. & Mch. Co., 4401 Roosevelt Rd., Chicago.
PULLEYS—Magnetic
Cutler-Hammer, Inc., Milwaukee.
PULLEYS—Vacuum Cup
Vacuum Cup Metal Pulley Co., Inc., Detroit, Mich.
PULVERIZERS
American Pulverizer Co., 1439 Macklind Ave., St. Louis, Mo.
Whiting Corp., Harvey, Ill.
PUMPS—Acid Resisting
Duriron Co., Inc., The, 438 N. Findlay St., Dayton, Ohio.
Haveg Corporation, Newark, Delaware.
PUMPS—Boiler Feed
Aldrich Pump Co., The, Allentown, Pa.
Ingersoll-Rand Co. (Cameron), 11 Broadway, N. Y. C.
PUMPS—Centrifugal
Aldrich Pump Co., The, Allentown, Pa.
Fairbanks, Morse & Co., Chicago.
Ingersoll-Rand Co. (Cameron), 11 Broadway, N. Y. C.
Pennsylvania Pump & Compressor Co., Easton, Pa.
Ruthman Machinery Co., Cincinnati.
Tomkins-Johnson Co., The, Jackson, Mich.
Worthington Pump & Machinery Corp., Harrison, N. J.
PUMPS—Coolant
Ruthman Machinery Co., Cincinnati.
PUMPS—Electric
Fairbanks, Morse & Co., Chicago.
PUMPS—Hydraulic
Aldrich Pump Co., The, Allentown, Pa.
American Engineering Co., Philadelphia.
Elmes, Chas. F., Engng. Wks., Chicago.
Fairbanks, Morse & Co., Chicago.
Lake Erie Engineering Corp., 68 Kenmore Sta., Buffalo, N. Y.
Worthington Pump & Machinery Corp., Harrison, N. J.
PUMPS—Power
Fairbanks, Morse & Co., Chicago.
Worthington Pump & Machinery Corp., Harrison, N. J.
PUMPS—Rotary Positive, Centrifugal & Turbine
Crane Co., Chicago.
PUMPS—Steam
Fairbanks, Morse & Co., Chicago.
Ingersoll-Rand Co. (Cameron), 11 Broadway, N. Y. C.
Worthington Pump & Machinery Corp., Harrison, N. J.
PUMPS—Vacuum
Pennsylvania Pump & Compressor Co., Easton, Pa.
Worthington Pump & Machinery Corp., Harrison, N. J.
PUNCHES & DIES
Cleveland Steel Tool Co., The, 660 E. 82d St., Cleveland, Ohio.
PUNCHING AND SHEARING MACHINES
Beatty Mch. & Mfg. Co., 936—150th St., Hammond, Ind.
Bertsch & Co., Cambridge City, Ind.
Cincinnati (Ohio) Shaper Co., The.
Excelsior Tool & Mach. Co., E. St. Louis, Ill.
G. D. S. Machinery & Supply Co., Inc., 101 Walker St., N. Y. C.
Niagara Machine & Tools Works, Buffalo, N. Y.
Pels, Henry, & Co., Inc., 90 West St., N. Y. C.
Schatz Mfg. Co., The, Poughkeepsie, N. Y.
Thomas Mach. Mfg. Co., Pittsburgh.
PYROMETERS—Indicating
Brown Instrument Co., The, Philadelphia, Pa.
Hoskins Mfg. Co., Detroit, Mich.
Leeds & Northrup Co., Philadelphia.
RAILS
Carnegie-Illinois Steel Corp. (U. S. Steel Corp. Subsidiary), Pittsburgh & Chicago.
Foster, L. B., Co., Inc., Pittsburgh.
Frank, M. K., 480 Lexington Ave., N. Y. C.
Tennessee Coal, Iron & Railroad Co. (U. S. Steel Corp. Subsidiary), Birmingham, Ala.
RAILS—Relaying
Hyman-Michaels Co., Chicago.
Iron & Steel Products, Inc., Chicago.
Sherwood, E. C., 50 Church St., N. Y. C.
RAILWAY EQUIPMENT & SUPPLIES
Fairbanks, Morse & Co., Chicago.
Iron & Steel Products, Inc., Chicago.
REAMERS
Cleveland (Ohio) Twist Drill Co., The.
Greenfield (Mass.) Tap & Die Corp.
Morse Twist Drill & Mch. Co., New Bedford, Mass.
Pratt & Whitney Div. Niles-Bement-Pond Co., Hartford, Conn.
REAMING MACHINES
Blanchard Machine Co., The, Cambridge, Mass.
RECORDERS—Furnace Atmosphere
Brown Instrument Co., The, Philadelphia, Pa.
REELS—For Coil Stock
Littell, F. J., Mch. Co., Chicago.
REFRACTORIES
Babcock & Wilcox Co., The, 85 Liberty St., New York City.
Cleveland (Ohio) Quarries Co., The.
Illinois Clay Products Co., Joliet, Ill.
West Virginia Fire Clay Mfg. Co., Pittsburgh.
REGULATORS—Compressed Gas
Air Reduction Sales Co., 60 East 42nd St., N. Y. C.
Linde Air Products Company, The, 30 East 42nd St., N. Y. C.
REINFORCEMENT FABRIC—Concrete
Pittsburgh (Pa.) Steel Co.
Wickwire Spencer Steel Co., 41 East 42nd St., N. Y. C.
RETORTS—Alloy
Electro Alloys Co., Elyria, Ohio.
RINGS—Iron or Steel
Midvale Co., The, Nicetown, Phila., Pa.
Standard Steel Wks. Co., Burnham, Pa.
RINGS—Welded
American Welding & Mfg. Co., Warren, O.
RIVET MAKING MACHINERY
Acme Machinery Co., Cleveland.
Manville, E. J., Mch. Co., Waterbury, Ct.
Waterbury (Conn.) Farrel Foundry & Machine Co., The.
RIVET SETS
Cleveland Steel Tool Co., The, 660 E. 82d St., Cleveland, Ohio.
RIVETING MACHINES
Hanna Engineering Works, 1761 Elston Ave., Chicago.
Hannifin Mfg. Co., Chicago.
Shuster, F. B., Co., The, New Haven, Ct.
Tomkins-Johnson Co., The, Jackson, Mich.
RIVETS
Blake & Johnson Co., The, Waterville, Ct.
Clark Bros. Bolt Co., Millidale, Conn.
Hassall, John, Inc., Clay & Oakland Sts., Bklyn., N. Y.
Progressive Mfg. Co., Torrington, Conn.
Russell, Burdsall & Ward Bolt & Nut Co., Port Chester, N. Y.
RODS—Aluminum
Aluminum Co. of America, Pittsburgh.
RODS—Brass
American Brass Co., The, Waterbury, Conn.
Revere Copper & Brass, Inc., 230 Park Ave., N. Y. C.
RODS—Magnesium Alloys
Dow Chemical Co., The, 921 Jefferson Ave. Midland, Mich.
RODS—Nickel Silver
American Brass Co., The, Waterbury, Conn.
Seymour (Conn.) Mfg. Co.
RODS—Phosphor Bronze
American Brass Co., The, Waterbury, Conn.
Phosphor Bronze Smelting Co., The, Phila.
Revere Copper & Brass, Inc., 230 Park Ave., N. Y. C.
Seymour (Conn.) Mfg. Co.

Products Index

RODS—Rustless
Rustless Iron & Steel Corp., Baltimore, Md.

RODS—Welding
Air Reduction Sales Co., 60 East 42nd St., N. Y. C.
American Brass Co., The, Waterbury, Conn.
American Steel & Wire Co. (U. S. Steel Corp. Subsidiary), Chicago.
Electric Arc Cutting & Welding Co., The, Newark, N. J.
Harnischfeger Corp., 4401 W. National Ave., Milwaukee.
Lincoln Electric Co., The, Cleveland.
Linde Air Products Company, The, 30 East 42nd St., N. Y. C.
Pittsburgh (Pa.) Steel Co.
Revere Copper & Brass, Inc., 230 Park Ave., N. Y. C.
Una Welding, Inc., Cleveland, Ohio.
Wilson Welder & Metals Co., Inc., 60 E. 42nd St., New York City.

RODS—Wire
American Steel & Wire Co. (U. S. Steel Corp. Subsidiary), Chicago.
Bethlehem (Pa.) Steel Co.
Jones & Laughlin Steel Corp., Pittsburgh.
Pittsburgh (Pa.) Steel Co.
Wickwire Brothers, Cortland, N. Y.
Wickwire Spencer Steel Co., 41 East 42nd St., N. Y. C.
Youngstown (Ohio) Sheet & Tube Co., The.

ROLLING MACHINERY—Cold Rolling
Cold Metal Process Co., The, Youngstown, Ohio.
Lewis Foundry & Mch. Co., Pittsburgh.
United Engineering & Fdry. Co., Ptgh.

ROLLING MACHINERY—Sheet Metal
Lewis Foundry & Mch. Co., Pittsburgh.

ROLLING MILL MACHINERY
Aetna-Standard Engineering Co., The, Youngstown, Ohio.
Birdsboro (Pa.) Steel Foundry & Machine Co.
Cold Metal Process Co., The, Youngstown, Ohio.
Farrel-Birmingham Co., Inc., Ansonia, Ct.
Hyde Park (Pa.) Fdry. & Mch. Co.
Lewis Foundry & Mch. Co., Pittsburgh.
Mesta Mch. Co., Pittsburgh.
Morgan Construction Co., Worcester, Mass.
Morgan Engineering Co., The, Alliance, O.
National Roll & Fdry. Co., Avonmore, Pa.
Standard Machinery Co., Providence, R. I.
United Engineering & Fdry. Co., Ptgh.
Waterbury (Ct.) Farrel Fdry. & Mch. Co. The.

ROLLING MILLS—Copper Rod & Sheet
Torrington (Conn.) Mfg. Co., The.

ROLLS—Alloy Steel
Pittsburgh (Pa.) Rolls Corp.

ROLLS—Bending and Straightening
Baldwin-Southwark Corp., Southwark Div., Philadelphia.
Bertsch & Co., Cambridge City, Ind.
Lake Erie Engineering Corp., 68 Kenmore Sta., Buffalo, N. Y.
Niagara Machine & Tool Works, Buffalo, N. Y.
Schatz Mfg. Co., The, Poughkeepsie, N. Y.

ROLLS—Rubber Covered
Manhattan Rubber Mfg. Div. of Raybestos-Manhattan, Inc., The, 2 Townsend St., Passaic, N. J.

ROLLS—Sand Chilled Iron and Steel
Aetna-Standard Engineering Co., The Youngstown, Ohio.
Birdsboro (Pa.) Steel Foundry & Machine Co.
Hyde Park (Pa.) Fdry. & Mch. Co.
Lewis Foundry & Mch. Co., Pittsburgh.
Mackintosh-Hemphill Co., Pittsburgh.
Mesta Mch. Co., Pittsburgh.
National Roll & Fdry. Co., Avonmore, Pa.
Pittsburgh (Pa.) Rolls Corp.
United Engineering & Fdry. Co., Ptgh.

ROLLS—Special Hardened
Midvale Co., The Nicetown, Phila., Pa.

ROOFING—Special Copper Bearing Steel
Superior Sheet Steel Co., Canton, Ohio.

ROOFING AND SIDING—Corrugated and Plain
American Rolling Mill Co., Middletown, O.
Carnegie-Illinois Steel Corp. (U. S. Steel Corp. Subsidiary), Pittsburgh & Chicago.
Johns-Manville Corp., 22 East 40th St., New York City.
Weirton (W. Va.) Steel Co.
Youngstown (Ohio) Sheet & Tube Co., The.

ROOFING AND SIDING—Iron and Steel
Inland Steel Co., Chicago.

ROOFING & SIDING—(Zinc)—Corrugated & Plain
New Jersey Zinc Co., The, 160 Front St., N. Y. C.

RUBBER LININGS
Goodrich, B. F., Co., The, Akron, Ohio.
Goodyear Tire & Rubber Co., Akron, Ohio.

RUBBER MOLDED PARTS
Goodyear Tire & Rubber Co., Akron, Ohio.
Manhattan Rubber Mfg. Div. of Raybestos-Manhattan, Inc., The, 2 Townsend St., Passaic, N. J.
Richardson Co., The, Melrose Park, Ill.

RUST PREVENTIVES
American Chemical Paint Co., Ambler, Pa.
American Lanolin Corp., Lawrence, Mass.
Midland Paint & Varnish Co., The, Cleveland.
Parker Rust-Proof Co., 2186 Milwaukee Ave., Detroit.

RUST PROOFING COMPOUNDS
Parker Rust-Proof Co., 2186 Milwaukee Ave., Detroit.

RUST PROOFING PROCESS
American Chemical Paint Co., Ambler, Pa.
Parker Rust-Proof Co., 2186 Milwaukee Ave., Detroit.
Udylite Co., The, Detroit.

SAND BLAST EQUIPMENT AND MACHINES
American Foundry Equipment Co., The, 401 Byrkit St., Mishawaka, Ind.
Panghorn Corporation, Hagerstown, Md.

SAND BLAST STEEL SHOT
American Foundry Equipment Co., The, 401 Byrkit St., Mishawaka, Ind.
Pittsburgh (Pa.) Crushed Steel Co.

SAND HANDLING EQUIPMENT
Bartlett, C. O.-Snow Co., The, Cleveland.

SAWING MACHINES—Metal
Espen-Lucas Mch. Works, Phila.
Peerless Mch. Co., Racine, Wis.
Tannewitz Works, The, Grand Rapids, Mich.

SAWING MACHINES—Metal-Band
Continental Machine Specialties, Inc., Minneapolis, Minn.
Tannewitz Works, The, Grand Rapids, Mich.

SAWS—Band and Hack for Metal
Armstrong-Blum Mfg. Co., Chicago.
Atkins, E. C., & Co., Indianapolis.
Disston, Henry, & Sons, Inc., Philadelphia.
Tannewitz Works, The, Grand Rapids, Mich.
Wells Mfg. Corp., Three Rivers, Mich.

SAWS—Circular, Rip & Cutoff
Atkins, E. C., & Co., Indianapolis.

SAWS—Friction
Atkins, E. C., & Co., Indianapolis.
Disston, Henry, & Sons, Inc., Philadelphia.

SAWS—Hack Saw Blades
Atkins, E. C., & Co., Indianapolis.
Peerless Mch. Co., Racine, Wis.
Starrett, L. S., Co., Athol, Mass.

SAWS—Hot Metal
Atkins, E. C., & Co., Indianapolis.
Disston, Henry, & Sons, Inc., Philadelphia.

SAWS—Inserted Tooth, Cold
Disston, Henry, & Sons, Inc., Philadelphia.
Tabor Mfg. Co., Philadelphia.

SAWS—Milling
Atkins, E. C., & Co., Indianapolis.
Disston, Henry, & Sons, Inc., Philadelphia.

SAWS—Portable Electric
Black & Decker Mfg. Co., The, Towson, Md.

SCALES
Exact Weight Scale Co., Columbus, Ohio.
Fairbanks, Morse & Co., Chicago.
Streeter-Amet Co., Chicago.

SCREENS—Perforated Metal
Chicago Perforating Co., 2440 W. 24th Place, Chicago, Ill.
Diamond Mfg. Co., Wyoming, Pa.
Erdle Perforating Co., Rochester, N. Y.
Harrington & King Perforating Co., Chicago.
Hendrick Mfg. Co., Carbondale, Pa.
Mundt, Chas., & Sons, 59 Fairmount Ave., Jersey City, N. J.

SCREENS—Woven Wire
Wickwire Brothers, Cortland, N. Y.
Wickwire Spencer Steel Co., 41 East 42nd St., N. Y. C.

SCREW MACHINE PRODUCTS
Barnes, Wallace Co., The, Div. of Associated Spring Corp., Bristol, Conn.
Blake & Johnson Co., The, Waterville, Ct.
Commonwealth Brass Corp., Detroit.
Eastern Mch. Screw Corp., New Haven.
Houde Engineering Corp., Buffalo, N. Y.
National Acme Co., The, Cleveland.
Olson Mfg. Co., Worcester, Mass.
Ottemiller, Wm. H., Co., Inc., York, Pa.
Peck Spring Co., The, Plainville, Conn.
Progressive Mfg. Co., Torrington, Conn.
Screw Mch. Products Corp., Prov., R. I.

SCREW MACHINERY—Automatic
Brown & Sharpe Mfg. Co., Providence, R. I.
Cone Automatic Mach. Co., Inc., Windsor, Vt.
National Acme Co., The, Cleveland.

SCREW MACHINERY—Hand
Warner & Swasey Co., The, Cleveland.

SCREW MACHINERY—Multiple Spindle
Acme Machine Tool Co., Cincinnati.
Cone Automatic Mach. Co., Inc., Windsor, Vt.
National Acme Co., The, Cleveland.

SCREW PLATES
Greenfield (Mass.) Tap & Die Corp.

SCREW STOCK
Bliss & Laughlin, Inc., Harvey, Ill.
Union Drawn Steel Co., Massillon, Ohio.

SCREWS—Cap
Cleveland (Ohio) Cap Screw Co., The.
Lamson & Sessions Co., The, Cleveland.
National Acme Co., The, Cleveland
Ottemiller, Wm. H., Co., Inc., York, Pa.

SCREWS—Coach or Lag
Lamson & Sessions Co., The, Cleveland.

SCREWS—Machine
Blake & Johnson Co., The, Waterville, Ct.
Lamson & Sessions Co., The, Cleveland.
Progressive Mfg. Co., The, Torrington, Ct.

SCREWS—Safety Set
Progressive Mfg. Co., The, Torrington, Ct.
Standard Pressed Steel Co., Jenkintown, Pa.

SCREWS—Set
Cleveland (Ohio) Cap Screw Co., The.
National Acme Co., The, Cleveland.
Ottemiller, Wm. H., Co., Inc., York, Pa.

Products Index

SCREWS, Socket, Head, Cap
Standard Pressed Steel Co., Jenkintown, Pa.

SCREWS—Thumb
Parker-Kalon Corp., 196 Varick St., N. Y.

SCRUBBING MACHINES—Sheet
Wean Engineering Co., Inc., The, Warren, Ohio.

SCYTHE STONES AND WHETSTONES
Carborundum Co., The, Niagara Falls, N.Y.

SECOND - HAND MACHINERY—(See Clearing House Section)

SEPARATORS—Magnetic
Dings Magnetic Separator Co., Milkauwee.
Ohio Electric Mfg. Co., The, 5908 Maurice Ave., Cleveland.
Stearns Magnetic Mfg. Co., 635 So. 28th St., Milwaukee.

SHAFTING—Cold Drawn
Union Drawn Steel Co., Massillon, Ohio.
Wyckoff Drawn Steel Co., Pittsburgh, Pa.

SHAFTING—Forged
Bay City Forge Co., Erie, Pa.

SHAFTING—Steel
Bliss & Laughlin, Inc., Harvey, Ill.
Union Drawn Steel Co., Massillon, Ohio.

SHAFTING—Turned and Ground
Bliss & Laughlin, Inc., Harvey, Ill.
Ryerson, Jos. T., & Son, Inc., Chicago.
Union Drawn Steel Co., Massillon, Ohio.
Wyckoff Drawn Steel Co., Pittsburgh, Pa.

SHAPERS
Cincinnati (Ohio) Shaper Co., The.

SHAPERS—Vertical
Pratt & Whitney Div. Niles-Bement-Pond Co., Hartford, Conn.

SHAPES—Cold Drawn
Bliss & Laughlin, Inc., Harvey, Ill.
Union Drawn Steel Co., Massillon, Ohio.
Wyckoff Drawn Steel Co., Pittsburgh, Pa.

SHAPES—Wire
American Spring & Mfg. Corp., Holly, Mich.
Cuyahoga Spring Co., The, Cleveland.
Eastern Tool & Mfg. Co., Bloomfield, N. J.
Grammes, L. F., & Sons, Inc., Allentown, Pa.
Lee Spring Co., Inc., 30 Main St., Brooklyn, N. Y.
Roebling's, John A. Sons Co., Trenton, N. J.

SHEAR BLADES & KNIVES
American Shear Knife Co., Homestead, Pa.
Canton Fdry. & Mch. Co., Cleveland.

SHEARING MACHINES—Alligator
Canton Fdry. & Mch. Co., Cleveland.

SHEARING MACHINES—Angle, Hand and Power
Federal Bearings Co., Inc., The, Poughkeepsie, N. Y.
G. D. S. Machinery & Supply Co., Inc., 101 Walker St., N. Y. C.
Schatz Mfg. Co., The, Poughkeepsie, N. Y.

SHEARING MACHINES—Bar
G. D. S. Machinery & Supply Co., Inc., 101 Walker St., N. Y. C.
Schatz Mfg. Co., The, Poughkeepsie, N. Y.
United Engineering & Fdry. Co., Pitgh.

SHEARING MACHINES — Beam and Channel
Schatz Mfg. Co., The, Poughkeepsie, N. Y.
United Engineering & Fdry. Co., Pitgh.

SHEARING MACHINES—Billet
Morgan Engineering Co., The, Alliance, O.
Pels, Henry, & Co., Inc., 90 West St., N. Y. C.
Schatz Mfg. Co., The, Poughkeepsie, N. Y.
United Engineering & Fdry. Co., Pitgh.

SHEARING MACHINES — Continuous Sheet & Pack
Aetna-Standard Engineering Co., The, Youngstown, Ohio.

SHEARING MACHINES—Plate
Bertsch & Co., Cambridge City, Ind.
Cincinnati (Ohio) Shaper Co., The.
Dreis & Krump Mfg. Co., Chicago.
Mesta Mch. Co., Pittsburgh.
Morgan Engineering Co., The, Alliance, O.
Niagara Machine & Tool Works, Buffalo, N. Y.
Pels, Henry, & Co., Inc., 90 West St., N. Y. C.
Schatz Mfg. Co., The, Poughkeepsie, N. Y.
United Engineering & Fdry. Co., Pitgh.

SHEARING MACHINES — Sheet and Plate
Beatty Mch. & Mfg. Co., 936—150th St., Hammond, Ind.
Cincinnati (Ohio) Shaper Co., The.
Dreis & Krump Mfg. Co., Chicago.
Niagara Mach. & Tool Wks., Buffalo, N. Y.

SHEARING MACHINES—Squaring
Cincinnati (Ohio) Shaper Co., The.
Dreis & Krump Co., Chicago.
Niagara Mach. & Tool Wks., Buffalo, N. Y.

SHEARS—Hand for Sheet Metal
Bremil Mfg. Co., Erie, Pa.

SHEET BARS
Jones & Laughlin Steel Corp., Pittsburgh.

SHEET METAL MACHINERY
Cincinnati (Ohio) Shaper Co., The.
Dreis & Krump Mfg. Co., Chicago.
New Albany (Ind.) Mch. Mfg. Co.
Niagara Mach. & Tool Wks., Buffalo, N. Y.
Peck, Stow & Wilcox Co., The, Southington, Conn.
V & O Press Co., Hudson, N. Y.
Waterbury (Conn.) Farrel Foundry & Machine Co., The.

SHEETS—Aluminum
Aluminum Co. of America, Pittsburgh.

SHEETS—Auto Body
American Rolling Mill Co., Middletown, O.
Bethlehem (Pa.) Steel Co.
Carnegie-Illinois Steel Corp. (U. S. Steel Corp. Subsidiary), Pittsburgh & Chicago.
Inland Steel Co., Chicago.
Republic Steel Corp., Cleveland, Ohio.
Youngstown (Ohio) Sheet & Tube Co., The.

SHEETS—Black
American Rolling Mill Co., Middletown, O.
Bethlehem (Pa.) Steel Co.
Carnegie-Illinois Steel Corp. (U. S. Steel Corp. Subsidiary), Pittsburgh & Chicago.
Columbia Steel Co. (U. S. Steel Corp. Subsidiary), San Francisco, Calif.
Granite City (Ill.) Steel Co.
Ingersoll Steel & Disc Co., Chicago.
Inland Steel Co., Chicago.
Republic Steel Corp., Cleveland, Ohio.
Ryerson, Jos., T., & Son, Inc., Chicago.
Scully Steel Products Co. (U. S. Steel Corp. Subsidiary), Chicago.
Tennessee Coal, Iron & Railroad Co. (U. S. Steel Corp. Subsidiary), Birmingham, Ala.
Weirton (W. Va.) Steel Co.

SHEETS—Blue Annealed
Alan Wood Steel Co., Conshohocken, Pa.
American Rolling Mill Co., Middletown, O.
Bethlehem (Pa.) Steel Co.
Carnegie-Illinois Steel Corp. (U. S. Steel Corp. Subsidiary), Pittsburgh & Chicago.
Granite City (Ill.) Steel Co.
Great Lakes Steel Corp., Detroit.
Ryerson, Jos. T., & Son, Inc., Chicago.
Weirton (W. Va.) Steel Co.
Worth Steel Co., Claymont, Del.

SHEETS—Brass, Bronze, Copper, Nickel, Silver or Phosphor Bronze
American Brass Co., The, Waterbury, Conn.
Phosphor Bronze Smelting Co., The, Phila.
Revere Copper & Brass, Inc., 230 Park Ave., N. Y. C.
Seymour (Conn.) Mfg. Co.

SHEETS—Chrome
Carnegie-Illinois Steel Corp. (U. S. Steel Corp. Subsidiary), Pittsburgh & Chicago.

SHEETS—Chrome Nickel
Carnegie-Illinois Steel Corp. (U. S. Steel Corp. Subsidiary), Pittsburgh & Chicago.

SHEETS—Cold Rolled
American Rolling Mill Co., Middletown, O.
Bethlehem (Pa.) Steel Co.
Carnegie-Illinois Steel Corp. (U. S. Steel Corp. Subsidiary), Pittsburgh & Chicago.
Granite City (Ill.) Steel Co.
Great Lakes Steel Corp., Detroit.
Inland Steel Co., Chicago.
Republic Steel Corp., Cleveland, Ohio.
Ryerson, Jos., T., & Son, Inc., Chicago.
Weirton (W. Va.) Steel Co.

SHEETS—Copper Alloy
American Brass Co., The Waterbury, Conn.

SHEETS—Copper Steel
Carnegie-Illinois Steel Corp. (U. S. Steel Corp. Subsidiary), Pittsburgh & Chicago.
Inland Steel Co., Chicago.

SHEETS—Electrical
American Rolling Mill Co., Middletown, O.
Carnegie-Illinois Steel Corp. (U. S. Steel Corp. Subsidiary), Pittsburgh & Chicago.
Republic Steel Corp., Cleveland, Ohio

SHEETS—Enameling
American Rolling Mill Co., Middletown, O.
Carnegie-Illinois Steel Corp. (U. S. Steel Corp. Subsidiary), Pittsburgh & Chicago.
Columbia Steel Co. (U. S. Steel Corp. Subsidiary), San Francisco, Calif.
Great Lakes Steel Corp., Detroit.
Inland Steel Co., Chicago.

SHEETS—For Drawing and Stamping
American Rolling Mill Co., Middletown, O.
Carnegie-Illinois Steel Corp. (U. S. Steel Corp. Subsidiary), Pittsburgh & Chicago.
Republic Steel Corp., Cleveland, Ohio
Ryerson, Jos. T., & Son, Inc., Chicago.
Superior Sheet Steel Co., Canton, Ohio.
Worth Steel Co., Claymont, Del.

SHEETS—Full Finished
Carnegie-Illinois Steel Corp. (U. S. Steel Corp. Subsidiary), Pittsburgh & Chicago.
Republic Steel Corp., Cleveland, Ohio.
Youngstown (Ohio) Sheet & Tube Co., The.

SHEETS—Galvanized, Flat and Corrugated
American Rolling Mill Co., Middletown, O.
Bethlehem (Pa.) Steel Co.
Carnegie-Illinois Steel Corp. (U. S. Steel Corp. Subsidiary), Pittsburgh & Chicago.
Columbia Steel Co. (U. S. Steel Corp. Subsidiary), San Francisco, Calif.
Continental Steel Corp., Kokomo, Ind.
Granite City (Ill.) Steel Co.
Inland Steel Co., Chicago.
Republic Steel Corp., Cleveland, Ohio.
Ryerson, Jos. T., & Son, Inc., Chicago.

Products Index

Tennessee Coal, Iron & Railroad Co. (U. S. Steel Corp. Subsidiary), Birmingham, Ala.
Weirton (W. Va.) Steel Co.
Youngstown (Ohio) Sheet & Tube Co., The.

SHEETS—Lead
National Lead Co., 111 Bdway., N. Y. C.

SHEETS—Long Terne
Carnegie-Illinois Steel Corp. (U. S. Steel Corp. Subsidiary), Pittsburgh & Chicago.
Weirton (W. Va.) Steel Co.

SHEETS—Magnesium Alloys
Dow Chemical Co., The, 921 Jefferson Ave., Midland, Mich.

SHEETS—Metal Furniture
Carnegie-Illinois Steel Corp. (U. S. Steel Corp. Subsidiary), Pittsburgh & Chicago.
Republic Steel Corp., Cleveland, Ohio.

SHEETS—Pickled
Carnegie-Illinois Steel Corp. (U. S. Steel Corp. Subsidiary), Pittsburgh & Chicago.

SHEETS—Tin Mill Black
American Rolling Mill Co., Middletown, O.
Carnegie-Illinois Steel Corp. (U. S. Steel Corp. Subsidiary), Pittsburgh & Chicago.

SHEETS—Zinc
New Jersey Zinc Co., The, 160 Front St., N. Y. C.

SHELVING—Steel
Frick-Gallagher Mfg. Co., The, Wellston, Ohio.

SHOVELS—Mounted—See Cranes

SHUTTERS—Steel & Wood Bi-Folding
Kinnear Mfg. Co., Columbus, Ohio.

SILICO—MANGANESE
Electro Metallurgical Sales Corp., 30 E. 42nd St., N. Y. C.

SILICON METAL & ALLOYS
Electro Metallurgical Sales Corp., 30 E. 42nd St., N. Y. C.

SLINGS—Wire Rope
Murray Safety Sling Co., Inc., Pitts., Pa.
Roebling's, John A., Sons Co., Trenton, N. J.

SLOTTING MACHINES
Nazel Engineering & Machine Works, Philadelphia.

SOLVENTS—Oil & Grease
Detroit Rex Products Co., Detroit, Mich.

SPACING TABLES—Punching & Shearing
Thomas Mach. Mfg. Co., Pittsburgh.

SPECIAL MACHINERY
Baldwin-Southwark Corp., Southwark Div., Philadelphia.
Birdsboro (Pa.) Steel Foundry & Machine Co.
Bullard Co., The, Bridgeport, Conn.
Eastern Tool & Mfg. Co., Bloomfield, N. J.
Farquhar, A. B., Co., Ltd., York, Pa.
Gifford-Wood Co., Hudson, N. Y.
Houde Engineering Corp., Buffalo, N. Y.
Manville, E. J., Mch. Co., Waterbury, Ct.
Morgan Engineering Co., The, Alliance, O.
Taft-Peirce Mfg. Co., The, Woonsocket, R. I.
Wood, R. D., & Co., Philadelphia.

SPECIALTIES—Rubber Covered & Lined
Goodrich, B. F., Co., The, Akron, Ohio.

SPEED REDUCERS
Boston Gear Wks., Inc., North Quincy, Mass.
Cleveland (Ohio) Worm & Gear Co.
Horsburgh & Scott Co., 5112 Hamilton Ave., Cleveland.
James, D. O., Mfg. Co., Chicago.
Jones, W. A., Fdry. & Mch. Co., 4401 Roosevelt Rd, Chicago.
Link-Belt Co., Chicago.
Philadelphia (Pa.) Gear Works.
Poole Foundry & Mch. Co., Baltimore, Md.

SPIEGELEISEN
Electro Metallurgical Sales Corp., 30 E. 42nd St., N. Y. C.

SPIKES—Screw
Oliver Iron & Steel Corp., Pittsburgh.

SPIKES—Track
Carnegie-Illinois Steel Corp. (U. S. Steel Corp. Subsidiary), Pittsburgh & Chicago.
Weirton (W. Va.) Steel Co.

SPINDLES—Grinding
Ex-Cell-O Corp., 1200 Oakman Blvd., Detroit.

SPINDLES—Hollow Bored
American Hollow Boring Co., 1912 Raspberry St., Erie, Pa.

SPLICE BARS
Carnegie-Illinois Steel Corp. (U. S. Steel Corp. Subsidiary), Pittsburgh & Chicago.

SPRAY FINISHING EQUIPMENT
DeVilbiss Co., The, Toledo, Ohio.

SPRAYERS—Metal
Metals Coating Co. of America, Phila., Pa.

SPRAYERS—Paint
DeVilbiss Co., The, Toledo, Ohio.

SPRING MAKING MACHINERY
Baird Mch. Co., The, Bridgeport, Conn.
Sleeper & Hartley, Inc., Worcester, Mass.
Torrington (Conn.) Mfg. Co., The.

SPRINGS—Car
Miller & Van Winkle, Inc., 18 Bridge St., Brooklyn, N. Y.

SPRINGS—Extension, Compression, Torsion or Flat
Amer. Spring & Mfg. Corp., Holly, Mich.
American Steel & Wire Co. (U. S. Steel Corp. Subsidiary), Chicago.
Barnes-Gibson-Raymond, Detroit Plant, Div. of Associated Spring Corp.
Barnes, Wallace Co., The, Div. of Associated Spring Corp., Bristol, Conn.
Cook Plant of Barnes-Gibson-Raymond, Div. of Associated Spring Corp., Ann Arbor, Mich.
Cuyahoga Spring Co., The, Cleveland.
Dunbar Bros. Co., Div. of Associated Spring Corp., Bristol, Conn.
Gibson, Wm. D., Co., Div. of Associated Spring Corp., Chicago.
Hubbard, M. D., Spring Co., 750 Central Ave., Pontiac, Mich.
Lee Spring Co., Inc., 30 Main St., Brooklyn, N. Y.
Miller & Van Winkle, Inc., 18 Bridge St., Brooklyn, N. Y.
Peck Spring Co., The, Plainville, Conn.
Raymond Mfg. Co., Div. of Associated Spring Corp., Corry, Pa.
U. S. Steel Wire Spring Co., Cleveland, O.
Wickwire Spencer Steel Co., 41 East 42nd St., N. Y. C.

SPROCKETS
Baldwin-Duckworth Chain Corp., Springfield, Mass.
Boston Gear Wks., Inc., North Quincy, Mass.
Diamond Chain & Mfg. Co., Indianapolis, Ind.
Morse Chain Co., Ithaca, New York.
Whitney Chain & Mfg. Co., Hartford, Ct.

STAMPINGS OR DRAWINGS—Metal
Barnes-Gibson-Raymond, Detroit Plant, Div. of Associated Spring Corp.
Barnes, Wallace Co., The, Div. of Associated Spring Corp., Bristol, Conn.
Central Iron & Steel Co., Harrisburg, Pa.
Champion Sheet Metal Co., Inc., cor. Squires & Duane Sts., Cortland, N. Y.
Cook Plant of Barnes-Gibson-Raymond, Div. of Associated Spring Corp., Ann Arbor, Mich.
Crosby Co., The, Buffalo, N. Y.
Dayton Rogers Mfg. Co., Minneapolis, Minn.
Dunbar Bros. Co., Div. of Associated Spring Corp., Bristol, Conn.
E S M C O Auto Products Corp., Bush Terminal Bldg. 27, Bklyn., N. Y.
Eastern Tool & Stpg. Co., Inc., Saugus, Mass.
Gibson, Wm. D., Co., Div. of Associated Spring Corp., Chicago.
Grammes, L. F., & Sons, Inc., Allentown, Pa.
Hubbard, M. D., Spring Co., 750 Central Ave., Pontiac, Mich.
Lansing (Mich.) Stamping Co., So. Penn. Ave.
Lee Spring Co., Inc., 30 Main St., Brooklyn, N. Y.
Miller & Van Winkle, Inc., 18 Bridge St., Brooklyn, N. Y.
New Monarch Machine & Stamping Co., Des Moines, Iowa.
Parish Pressed Steel Co., Reading, Pa.
Raymond Mfg. Co., Div. of Associated Spring Corp., Corry, Pa.
Sessions, J. H., & Son, Bristol, Conn.
Special Hardware Co., Medford, N. Y.
Toledo (Ohio) Stamping & Mfg. Co.
Torrington (Conn.) Company
Transue & Williams Steel Forging Corp., Alliance, Ohio.
Truscon Steel Co., Pressed Steel Div., Cleveland.
Wagner Specialty Co., Burlington, Wis.
Whitehead Stamping Co., 1669 W. Lafayette Blvd., Detroit, Mich.
Worcester (Mass.) Stamped Metal Co.

STAMPS—Steel Alphabets and Figures
Cunningham, M. E., Co., Pittsburgh.
Noble & Westbrook Mfg. Co., The, East Hartfrod, Ct.

STAPLES—Wire
Wickwire Brothers, Cortland, N. Y.

STEEL—Acid Resisting
Duriron Co., Inc., The, 438 N. Findlay St., Dayton, Ohio.

STEEL—Alloy
Alan Wood Steel Co., Conshohocken, Pa.
American Steel Export Co., Inc., 347 Madison Ave., N. Y. C.
Bethlehem (Pa.) Steel Company.
Bissett Steel Co., The, Cleveland.
Carnegie-Illinois Steel Corp. (U. S. Steel Corp. Subsidiary), Pittsburgh & Chicago.
Harrisburg (Pa.) Steel Corp.
Ingersoll Steel & Disc Co., Chicago.
Jessop Steel Co., Washington, Pa.
Latrobe (Pa.) Electric Steel Co.
Ludlum Steel Co., Watervliet, N. Y.
Republic Steel Corp., Cleveland, Ohio.
Ryerson, Jos. T., & Son, Inc., Chicago.
Tennessee Coal, Iron & Railroad Co. (U. S. Steel Corp. Subsidiary), Birmingham, Ala.
Timken Roller Bearing Co., The, Canton, O.
Timken Steel & Tube Div., The Timken Roller Bearing Co., Canton, O.
Vanadium-Alloys Steel Co., Latrobe, Pa.
Wheelock, Lovejoy & Co., Inc., Cambridge, Mass.

STEEL—Alloy, Cold Drawn
Bliss & Laughlin, Inc., Harvey, Ill.
Union Drawn Steel Co., Massillon, Ohio.
Wheelock, Lovejoy & Co., Inc., Cambridge, Mass.
Wyckoff Drawn Steel Co., Pittsburgh, Pa.

Products Index

STEEL—Bright Finished
Bliss & Laughlin, Inc., Harvey, Ill.
Union Drawn Steel Co., Massillon, Ohio.

STEEL—Carbon
American Steel Export Co., Inc., 347 Madison Ave., N. Y. C.
Bethlehem (Pa.) Steel Co.
Carnegie-Illinois Steel Corp. (U. S. Steel Corp. Subsidiary), Pittsburgh & Chicago.
Harrisburg (Pa.) Steel Corp.
Ingersoll Steel & Disc Co., Chicago.
Latrobe (Pa.) Electric Steel Co.

STEEL—Carbon Vanadium
Latrobe (Pa.) Electric Steel Co.

STEEL—Chrome
Latrobe (Pa.) Electric Steel Co.

STEEL—Chrome Manganese
Latrobe (Pa.) Electric Steel Co.

STEEL—Chrome Nickel
Harrisburg (Pa.) Steel Corp.
Latrobe (Pa.) Electric Steel Co.

STEEL—Chrome Nickel Silver
Ingersoll Steel & Disc Co., Chicago.

STEEL—Chrome Vanadium
Harrisburg (Pa.) Steel Corp.
Latrobe (Pa.) Electric Steel Co.

STEEL—Cobalt
Darwin & Milner, Inc., Cleveland.

STEEL—Cold Drawn
Bliss & Laughlin, Inc., Harvey, Ill.
Jones & Laughlin Steel Corp., Pittsburgh.
Latrobe (Pa.) Electric Steel Co.
Rathbone, A. B. & J., Palmer, Mass.
Ryerson, Joseph T., & Son, Inc., Chicago.
Union Drawn Steel Co., Massillon, Ohio.
Wyckoff Drawn Steel Co., Pittsburgh, Pa.

STEEL—Cold Rolled Strips
Acme Steel Co., Chicago.
American Steel & Wire Co. (U. S. Steel Corp. Subsidiary), Chicago.
Athenia Steel Co., Clifton, N. J.
Bethlehem (Pa.) Steel Co.
Cold Metal Process Co., The, Youngstown, Ohio.
Griffin Mfg. Co., Erie, Pa.
Latrobe (Pa.) Electric Steel Co.
Republic Steel Corp., Cleveland, Ohio.
Ryerson, Jos. T., & Sons, Inc., Chicago.
Scully Steel Products Co. (U. S. Steel Corp. Subsidiary), Chicago.
Stanley Works, The, New Britain, Conn.; Bridgeport, Conn.
Steel & Tubes, Inc., Cleveland.
Superior Steel Corp., Grant Bldg., Ptgh.
Thomas Steel Co., The, Warren, Ohio.
Weirton (W. Va.) Steel Co.
Wetherell Bros. Co., Cambridge, 39, Mass.

STEEL—Cold Rolled Strips, Electro Copper Coated
Thomas Steel Co., The, Warren, Ohio.

STEEL—Cold Rolled Strips, Electro-Galvanized
Acme Steel Co., Chicago, Ill.
Thomas Steel Co., The, Warren, Ohio.

STEEL—Cold Rolled Strips, Electro Tin Coated
Thomas Steel Co., The, Warren, Ohio.

STEEL—Cold Rolled Strips, Stainless
Acme Steel Co., Chicago.
Griffin Mfg. Co., Erie, Pa.

STEEL—Corrosion Resisting
Midvale Co., The, Nicetown, Phila., Pa.
Rustless Iron & Steel Corp., Baltimore, Md.

STEEL—Crucible
Jessop, Wm., & Sons, Inc., 121 Varick St., N. Y. C.
Jessop Steel Co., Washington, Pa.
Vanadium-Alloys Steel Co., Latrobe, Pa.

STEEL—Cutlery
Jessop Steel Co., Washington, Pa.
Latrobe (Pa.) Electric Steel Co.
Ludlum Steel Co., Watervliet, N. Y.

STEEL—Die
Disston, Henry, & Sons, Inc., Philadelphia.
Jessop, Wm., & Sons, Inc., 121 Varick St., N. Y. C.
Latrobe (Pa.) Electric Steel Co.
Ludlum Steel Co., Watervliet, N. Y.
Milne, A., & Co., 745 Washington St., N. Y. C.

STEEL—Drill
Latrobe (Pa.) Electric Steel Co.
Ludlum Steel Co., Watervliet, N. Y.
Milne, A., & Co., 745 Washington St., N. Y. C.

STEEL—Electric
Disston, Henry, & Sons, Inc., Philadelphia.
Latrobe (Pa.) Electric Steel Co.
Ludlum Steel Co., Watervliet, N. Y.
Timken Roller Bearing Co., The, Canton, O.
Timken Steel & Tube Div., The Timken Roller Bearing Co., Canton, O.
Wheelock, Lovejoy & Co., Inc., Cambridge, Mass.

STEEL—High Speed
Bethlehem (Pa.) Steel Company.
Cleveland (Ohio) Twist Drill Co., The.
Ingersoll Steel & Disc Co., Chicago.
Jessop Steel Co., Washington, Pa.
Latrobe (Pa.) Electric Steel Co.
Ludlum Steel Co., Watervliet, N. Y.
Milne, A., & Co., 745 Washington St., N. Y. C.
Vanadium-Alloys Steel Co., Latrobe, Pa.

STEEL—Hot Rolled Strips
Acme Steel Co., Chicago.
Bethlehem (Pa.) Steel Co.
Carnegie-Illinois Steel Corp. (U. S. Steel Corp. Subsidiary), Pittsburgh & Chicago.
Great Lakes Steel Corp., Detroit.
Inland Steel Co., Chicago.
Laclede Steel Co., St. Louis, Mo.
Latrobe (Pa.) Electric Steel Co.
Republic Steel Corp., Cleveland, Ohio.
Scully Steel Products Co. (U. S. Stee Corp. Subsidiary), Chicago.
Stanley Works, The, New Britain, Conn., Bridgeport, Conn.
Steel & Tubes, Inc., Cleveland.
Superior Steel Corp., Grant Bldg., Ptgh.
Weirton (W. Va.) Steel Co.

STEEL—Hot Rolled Strips, Electro Zinc Coated
Thomas Steel Co., The, Warren, Ohio.

STEEL—Hot Rolled Strips, Galvanized
Acme Steel Co., Chicago.

STEEL—Magnet
Latrobe (Pa.) Electric Steel Co.

STEEL—Open Hearth
Pittsburgh (Pa.) Steel Co.
Timken Roller Bearing Co., The, Canton, O.
Timken Steel & Tube Div., The Timken Roller Bearing Co., Canton, O.

STEEL—Rustless
Acme Steel Co., Chicago.
Griffin Mfg. Co., Erie, Pa.
Latrobe (Pa.) Electric Steel Co.
Ludlum Steel Co., Watervliet, N. Y.
Rustless Iron & Steel Corp., Baltimore, Md.

STEEL—Screw
Bliss & Laughlin, Inc., Harvey, Ill.
Timken Roller Bearing Co., The, Canton, O.
Timken Steel & Tube Div., The Timken Roller Bearing Co., Canton, O.
Union Drawn Steel Co., Massillon, Ohio.
Wyckoff Drawn Steel Co., Pittsburgh, Pa.

STEEL—Special Analysis
Harrisburg (Pa.) Steel Corp.
Latrobe (Pa.) Electric Steel Co.
Ludlum Steel Co., Watervliet, N. Y.
Republic Steel Corp., Cleveland, Ohio.
Timken Roller Bearing Co., The, Canton, O.
Timken Steel & Tube Div., The Timken Roller Bearing Co., Canton, O.

STEEL—Spring
Athenia Steel Co., Clifton, N. J.
Barnes-Gibson-Raymond, Detroit Plant, Div. of Associated Spring Corp.
Barnes, Wallace, Co., The, Div. of Associated Spring Corp., Bristol, Conn.
Gibson, Wm. D., Co., Div. of Associated Spring Corp., Chicago.
Great Lakes Steel Corp., Detroit.
Republic Steel Corp., Cleveland, Ohio.
Timken Roller Bearing Co., The, Canton, O.
Timken Steel & Tube Div., The Timken Roller Bearing Co., Canton, O.

STEEL-Stainless
Acme Steel Co., Chicago.
American Rolling Mill Co., Middletown, O.
Bethlehem (Pa.) Steel Company.
Carnegie-Illinois Steel Corp. (U. S. Steel Corp. Subsidiary), Pittsburgh & Chicago.
Disston, Henry, & Sons, Inc., Philadelphia.
Latrobe (Pa.) Electric Steel Co.
Ludlum Steel Co., Watervliet, N. Y.
Midvale Co., The, Nicetown, Phila., Pa.
Republic Steel Corp., Cleveland, Ohio.
Rustless Iron & Steel Corp., Baltimore, Md.
Ryerson, Jos. T., & Sons, Inc., Chicago.
Scully Steel Products Co. (U. S. Steel Corp. Subsidiary), Chicago.
Superior Steel Corp., Grant Bldg., Pittsburgh.
Union Drawn Steel Co., Massillon, Ohio.
Wetherell Bros. Co., Cambridge, 39, Mass.

STEEL—Stainless Clad
Ingersoll Steel & Disc Co., Chicago.

STEEL—Tool
Bethlehem (Pa.) Steel Company.
Bissett Steel Co., The Cleveland.
Darwin & Milner, Inc., Cleveland.
Disston, Henry, & Sons, Inc., Philadelphia.
Ingersoll Steel & Disc Co., Chicago.
Jessop Steel Co., Washington, Pa.
Jessop, Wm., & Sons, Inc., 121 Varick St., N. Y. C.
Latrobe (Pa.) Electric Steel Co.
Ludlum Steel Co., Watervliet, N. Y.
Midvale Co., The, Nicetown, Phila., Pa.
Milne, A., & Co., 745 Washington St., N. Y. C.
Ryerson, Jos., T., & Son, Inc., Chicago.
Tennessee Coal, Iron & Railroad Co. (U. S. Steel Corp. Subsidiary), Birmingham, Ala.
Vanadium-Alloys Steel Co., Latrobe, Pa.
Wheelock, Lovejoy & Co., Inc., Cambridge, Mass.
Windau Steel Co., Cleveland.

STEEL—Tool, Special Shapes
Forging & Casting Corp., The, Ferndale, Mich.
Latrobe (Pa.) Electric Steel Co.

STEEL—Vanadium
Latrobe (Pa.) Electric Steel Co.

STEEL PLANTS AND ROLLING MILLS
Brassert, H. A., & Co., Chicago, Ill.

STEEL ROLLS
United Engineering & Fdry. Co., Ptgh.

STOKERS
Babcock & Wilcox, The, 85 Liberty St., New York City.
Whiting Corp., Harvey, Ill.

Products Index

STOPS—Crane Limit
Electric Controller & Mfg. Co., The, Cleveland.

STRAIGHTENING MACHINES—Bar & Tube
Aetna-Standard Engineering Co., The, Youngstown, Ohio.
Medart Co., The, St. Louis, Mo.

STRUCTURAL IRON AND STEEL WORK
American Bridge Co. (U. S. Steel Corp. Subsidiary), Pittsburgh.
Bethlehem (Pa.) Steel Co.
Morgan Engineering Co., The, Alliance, O.

STRUCTURAL STEEL—See Angles, Beams, Channels and Tees

STUDS
Erie (Pa.) Bolt & Nut Co.

SUB PRESSES
U. S. Tool Co., Inc., Ampere, N. J.

SUPERHEATERS
Babcock & Wilcox Co., The, 85 Liberty St., New York City.

SWAGING MACHINES
Standard Machinery Co., Providence, R. I.
Torrington (Conn.) Company.

SWITCHES—Electric
Westinghouse Elec. & Mfg. Co., East Ptgh.

TANK LININGS
Ceilcote Co., The Cleveland.
Nukem Prods. Corp., 68 Niagara St., Buffalo, N. Y.

TANK LININGS—Rubber
Goodrich, B. F., Co., The, Akron, Ohio.
Goodyear Tire & Rubber Co., Akron, Ohio.
Manhattan Rubber Mfg. Div. of Raybestos-Manhattan, Inc., The, 2 Townsend St., Passaic, N. J.

TANKS—Alkali Cleaning
Detroit Rex Products Co., Detroit, Mich.

TANKS—Compressed Air, Gas, Oil and Water
Scaife, Wm. B., & Sons Co., Ptgh.
Westinghouse Air Brake Co., Industrial Div., Pittsburgh.

TANKS—Iron and Steel
Munroe R., & Sons Mfg. Corp., Pittsburgh.
Scaife, Wm. B., & Sons, Co., Ptgh.

TANKS—Lead Lined
Dietzel Lead Burning Co., Pittsburgh.

TANKS—Pickling
Atlas Mineral Prods. Co. of Pa., The Mertztown, Pa.
Blaw-Knox Co., Pittsburgh.
Cleveland (Ohio) Quarries Co., The.
Goodrich, B. F., Co., The, Akron, Ohio.
Goodyear Tire & Rubber Co., Akron, Ohio.
Haveg Corporation, Newark, Delaware.
Manhattan Rubber Mfg. Div. of Raybestos-Manhattan, Inc., The, 2 Townsend St., Passaic, N. J.
Nukem Products Corp., 68 Niagara St., Buffalo, N. Y.

TANKS—Rubber Lined
Blaw-Knox Co., Pittsburgh.
Goodrich, B. F., Co., The, Akron, Ohio.
Goodyear Tire & Rubber Co., Akron, Ohio.
Manhattan Rubber Mfg. Div. of Raybestos-Manhattan, Inc., The, 2 Townsend St., Passaic, N. J.

TANKS—Welded
Blaw-Knox Co., Pittsburgh.
National Tube Co. (U. S. Steel Corp. Subsidiary), Pittsburgh.
Scaife, Wm. B., & Sons Co., Pittsburgh.

TAPPING MACHINES
Baker Bros. Inc., Toledo, Ohio.
Ex-Cell-O Corp., 1200 Oakman Blvd., Detroit.
National Automatic Tool Co., Richmond, Ind.

TAPS—Collapsing
Landis Mach. Co., Inc., Waynesboro, Pa.
Murchey Machine & Tool Co., Detroit.
National Acme Co., The, Cleveland.

TAPS AND DIES
Greenfield (Mass.) Tap & Die Corp.
Landis Mch. Co., Inc., Waynesboro, Pa.
Morse Twist Drill & Mch. Co., New Bedford, Mass.
Pratt & Whitney Div. Niles-Bement-Pond Co., Hartford, Conn.

TEES—See Angles, Beams, Channels and Tees

TELEPHONES—Interior
Screw Machine Products Corp., Prov., R. I.

TERNE PLATES
Carnegie-Illinois Steel Corp. (U. S. Steel Corp. Subsidiary), Pittsburgh & Chicago.
Weirton (W. Va.) Steel Co.

TESTING MACHINES—Ductility
Olsen, Tinius Testing Machine Co., Philadelphia.

TESTING MACHINES—Hardness
Olsen, Tinius Testing Machine Co., Philadelphia.
Shore Instrument & Mfg. Co., The, Jamaica, L. I., N. Y.

TESTING MACHINES—Impact
Olsen, Tinius Testing Machine Co., Philadelphia.

TESTING MACHINES—Materials
Baldwin-Southwark Corp., Southwark Div., Phila.
Olsen, Tinius Testing Machine Co., Philadelphia.

TESTING MACHINES—Spring
Olsen, Tinius Testing Machine Co., Philadelphia.

TESTING MACHINES—Tensile
Olsen, Tinius Testing Machine Co., Philadelphia.

TESTING MACHINES—Torsion
Olsen, Tinius Testing Machine Co., Philadelphia.

TESTING MACHINES—Universal
Olsen, Tinius Testing Machine Co., Philadelphia.

THERMOMETERS
Weston Electrical Instrument Corp., Newark, N. J.

THERMOMETERS—Recording
Brown Instrument Co., The, Philadelphia, Pa.
Leeds & Northrup Co., Philadelphia.

THERMOSTATIC—Bimetal
Chace, W. M., Co., 1605 Beard Ave., Detroit.

THREAD CUTTING TOOLS—See Die Taps

THREAD ROLLING MACHINES
Manville, E. J., Mch. Co., Waterbury, Ct.
Nilson, A. H., Mach. Co., Bridgeport, Ct.
Waterbury (Ct.) Farrel Fdry. & Mch. Co., The.

THREADING MACHINES
Eastern Mesh. Screw Corp., New Haven, Conn.
Landis Mch. Co., Inc., Waynesboro, Pa.

THREADING MACHINES—Automatic
Landis Mch. Co., Inc., Waynesboro, Pa.

THREADING MACHINES—Bolt
Murchey Machine & Tool Co., Detroit.

TIE PLATES
Carnegie-Illinois Steel Corp. (U. S. Steel Corp. Subsidiary), Pittsburgh & Chicago.
Weirton (W. Va.) Steel Co.

TIES—BALE
Acme Steel Co., Chicago, Ill.

TIN PLATE
Carnegie-Illinois Steel Corp. (U. S. Steel Corp. Subsidiary), Pittsburgh & Chicago.
Granite City (Ill.) Steel Co.
Inland Steel Co., Chicago.
Jones & Laughlin Steel Corp., Pittsburgh.
Republic Steel Corp., Cleveland, Ohio.
Weirton (W. Va.) Steel Co.
Youngstown (Ohio) Sheet & Tube Co., The.

TIN PLATE MACHINERY
Aetna-Standard Engineering Co., The, Youngstown, Ohio.
Wean Engineering Co., Inc., The, Warren, Ohio.

TINNING EQUIPMENT—Sheets
Wean Engineering Co., Inc., The, Warren, Ohio.

TOOL BITS
Carboloy Co., Inc., 2985 E. Jefferson Ave., Detroit.

TOOL HOLDERS
Armstrong Bros. Tool Co., Chicago.
Williams, J. H., & Co., Buffalo, N. Y.

TOOLS—Lathe
Armstrong Bros. Tool Co., Chicago.
Carboloy Co., Inc., 2985 E. Jefferson Ave., Detroit.

TOOLS—Metal Cutting
Carboloy Co., Inc., 2985 E. Jefferson Ave., Detroit.
Pratt & Whitney Div. Niles-Bement-Pond Co., Hartford, Conn.

TOOLS—Precision
Starrett, L. S., Co., Athol, Mass.

TOOLS—Safety, Steel Stamp
Cunningham, M. E., Co., Pittsburgh.

TOOLS—Tungsten Carbide
Carboloy Co., Inc., 2985 E. Jefferson Ave., Detroit.
Ex-Cell-O Corp., 1200 Oakman Blvd., Detroit.

TORCHES—Brazing, Cutting and Welding
Air Reduction Sales Co., 60 East 42nd St., N. Y. C.
Linde Air Products Company, The, 30 East 42nd St., N. Y. C.
Weldit Acetylene Co., Detroit.

TRACTORS AND TRAILERS—See Trucks, Tractors and Trailers—Industrial

TRAILERS—Industrial—See Trucks, Tractors and Trailers—Industrial

TRAMRAILS—Overhead Systems
Cleveland Tramrail Div. of The Cleveland Crane & Engng. Co., Wickliffe, Ohio.
Harnischfeger Corp., 4401 W. National Ave., Milwaukee.

TRAMWAYS—Wire Rope
Leschen, A., & Sons Rope Co., St. Louis, Mo.

TRANSCRIBING MACHINES
Dictaphone Sales Corp., 420 Lexington Ave., New York City.

TRANSMISSIONS—Hydraulic
American Engineering Co., Philadelphia.
Oilgear Co., The, 1311 W. Bruce St., Milwaukee.

TRANSMISSIONS—Variable Speed
Link-Belt Co., Chicago.
Reeves Pulley Co., Columbus, Indiana.

TRAPS—Steam
Nicholson, W. H., & Co., 165 Oregon St., Wilkes-Barre, Pa.

Products Index

Products Index

WASHING MACHINES—For Metal Parts
Ransohoff, N., Inc., Cincinnati.

WASTE—Wiping
Lillie, Dexter P., Co., New Bedford, Mass.

WATER SOFTENERS AND PURIFIERS
Scaife, Wm. B., & Sons Co., Ptgh.

WELDING—Copper Hydrogen Electric
Bundy Tubing Co., Detroit, Mich.

WELDING—Electric
Federal Machine & Welder Co., Warren, Ohio.
Lincoln Electric Co., The, Cleveland.
Una Welding, Inc., Cleveland, Ohio.
Westinghouse Elec. & Mfg. Co., East Ptgh.

WELDING CONTACTS—Resistance
Electroloy Co., Inc., 50 Church St., New York City.

WELDING AND CUTTING MACHINES AND EQUIPMENT—Oxy-Acetylene
Air Reduction Sales Co., 60 East 42nd St., N. Y. C.
Linde Air Products Company, The, 30 East 42nd St., N. Y. C.
Weldit Acetylene Co., Detroit.

WELDING FIXTURES
Harnischfeger Corp., 4401 W. National Ave., Milwaukee.
Una Welding, Inc., Cleveland, Ohio.

WELDING MACHINES—Butt
Federal Machine & Welder Co., Warren, Ohio.
Swift Electric Welder Co., Detroit.
Thomson-Gibb Elec. Welding Co., Lynn, Mass.

WELDING MACHINES—Electric Arc
Electric Arc Cutting & Welding Co., The, Newark, N. J.
General Electric Co., Schenectady, N. Y.
Harnischfeger Corp., 4401 W. National Ave., Milwaukee, Wis.
Lincoln Electric Co., The, Cleveland.
Una Welding, Inc., Cleveland, Ohio.
Westinghouse Elec. & Mfg. Co., East Ptgh.
Wilson Welder & Metals Co., Inc., 60 E. 42nd St., New York City.

WELDING MACHINES—Electric Arc, Second-Hand. (See Clearing House Section)

WELDING MACHINES—Flash
Federal Machine & Welder Co., Warren, Ohio.
Swift Electric Welder Co., Detroit.
Thomson-Gibb Elec. Welding Co., Lynn, Mass.

WELDING MACHINES—Press
Federal Machine & Welder Co., Warren, Ohio.
Swift Electric Welder Co., Detroit.

WELDING MACHINES—Seam
Federal Machine & Welder Co., Warren, Ohio.

WELDING MACHINES—Spot
Federal Machine & Welder Co., Warren, Ohio.
Swift Electric Welder Co., Detroit.
Thomson-Gibb Elec. Welding Co., Lynn, Mass.

WELDING MACHINES—Universal Spot & Arc
Electric Arc Cutting & Welding Co., The, Newark, N. J.

WHEELS—Rolled Steel
Carnegie-Illinois Steel Corp. (U. S. Steel Corp. Subsidiary), Pittsburgh & Chicago.
Standard Steel Wks. Co., Burnham, Pa.

WIRE—Aluminum
Aluminum Co. of America, Pittsburgh.

WIRE—Barb
Jones & Laughlin Steel Corp., Pittsburgh.
Pittsburgh (Pa.) Steel Co.

WIRE—Brass, Bronze, Copper, Nickel Silver or Phosphor Bronze
American Brass Co., The, Waterbury, Conn.
Phosphor Bronze Smelting Co., The, Phila.
Revere Copper & Brass, Inc., 230 Park Ave., N. Y. C.
Seymour (Conn.) Mfg. Co.

WIRE—Electric Heat Resisting
Globar Div., The Carborundum Co., Niagara Falls, N. Y.

WIRE—Flat, Round, Square or Special Shapes
American Steel & Wire Co. (U. S. Steel Corp. Subsidiary), Chicago.
Barnes, Wallace Co., The, Div. of Associated Spring Corp., Bristol, Conn.
Page Steel & Wire Div., American Chain & Cable Co., Inc., Monessen, Pa.
Prentiss, Geo. W., & Co., Holyoke, Mass.
Roebling's, John A., Sons Co., Trenton, N. J.
Seneca Wire & Mfg. Co., The, Fostoria, O.
Wickwire Bros., Cortland, N. Y.
Wickwire Spencer Steel Co., 41 East 42nd St., N. Y. C.

WIRE—Insulated
American Steel & Wire Co. (U. S. Steel Corp. Subsidiary), Chicago.
Roebling's, John A., Sons Co., Trenton, N. J.

WIRE—Mattress
Roebling's, John A., Sons Co., Trenton, N. J.

WIRE—Netting
Roebling's, John A., Sons Co., Trenton, N. J.
Wickwire Brothers, Cortland, N. Y.

WIRE—Piano and Music
Webb Wire Works, New Brunswick, N. J.
Wickwire Spencer Steel Co., 41 East 42nd St., N. Y. C.

WIRE—Rustless
Rustless Iron & Steel Corp., Baltimore, Md.

WIRE—Special Drawn Shapes
Rathbone, A. B. & J., Palmer, Mass.

WIRE—Spring
American Steel & Wire Co. (U. S. Steel Corp. Subsidiary), Chicago.
Barnes, Wallace Co., The, Div. of Associated Spring Corp., Bristol, Conn.
Columbia Steel Co. (U. S. Steel Corp. Subsidiary), San Francisco, Calif.
Jones & Laughlin Steel Corp., Pittsburgh.
Pittsburgh (Pa.) Steel Co.
Roebling's, John A., Sons Co., Trenton, N. J.
Seneca Wire & Mfg. Co., The, Fostoria, Ohio.

WIRE—Spring (Music)
Webb Wire Works, New Brunswick, N. J.

WIRE—Stainless Steel
Page Steel & Wire Div., American Chain & Cable Co., Inc., Monessen, Pa.
Rustless Iron & Steel Corp., Baltimore, Md.
Webb Wire Works, New Brunswick, N. J.

WIRE—Steel
Bethlehem (Pa.) Steel Co.
Prentiss, Geo. W., & Co., Holyoke, Mass.
Wickwire Brothers, Cortland, N. Y.

WIRE—Welding
Air Reduction Sales Co., 60 East 42nd St., N. Y. C.
American Steel & Wire Co. (U. S. Steel Corp. Subsidiary), Chicago.
Lincoln Electric Co., The, Cleveland.
Maurath, Inc., 7400 Union Ave., Cleveland.
Page Steel & Wire Div., American Chain & Cable Co., Inc., Monessen, Pa.
Pittsburgh (Pa.) Steel Co.
Revere Copper & Brass, Inc., 230 Park Ave., N. Y. C.
Roebling's, John A., Sons Co., Trenton, N. J.
Seneca Wire & Mfg. Co., The, Fostoria, Ohio.
Una Welding, Inc., Cleveland, Ohio.
Wickwire Brothers, Cortland, N. Y.
Wickwire Spencer Steel Co., 41 East 42nd St., N. Y. C.
Wilson Welder & Metals Co., Inc., 60 E. 42nd St., New York City.

WIRE—Zinc
Platt Bros. & Co., The, Waterbury, Conn.

WIRE CLOTH
Buffalo (N. Y.) Wire Wks. Co., Inc.
Roebling's, John A., Sons Co., Trenton, N. J.
Wickwire Bros., Cortland, N. Y.
Wickwire Spencer Steel Co., 41 East 42nd St., N. Y. C.

WIRE DRAWING MACHINERY—See Wire Mill Mchry. & Equip.

WIRE FORMING MACHINERY
Baird Mch. Co., The, Bridgeport, Conn.
Manville, E. J., Mch. Co., Waterbury, Ct.
Nilson, A. H., Mach. Co., Bridgeport, Ct.
Sleeper & Hartley, Inc., Worcester, Mass.
U. S. Tool Co., Inc., Ampere, N. J.

WIRE MILL MACHINERY AND EQUIPMENT
Morgan Construction Co., Worcester, Mass.
Sleeper & Hartley, Inc., Worcester, Mass.
Torrington (Conn.) Mfg. Co., The.
Waterbury (Ct.) Farrel Fdry. & Mch. Co., The.

WIRE NAIL MACHINERY
Sleeper & Hartley, Inc., Worcester, Mass.

WIRE PRODUCTS
American Spring & Mfg. Corp., Holly, Mich.
American Steel & Wire Co. (U. S. Steel Corp. Subsidiary), Chicago.
Buffalo (N. Y.) Wire Wks. Co., Inc.
Eastern Tool & Mfg. Co., Bloomfield, N. J.
Hindley Mfg. Co., Valley Falls, R. I.
Pittsburgh (Pa.) Steel Co.
U. S. Steel Wire Spring Co., Cleveland, O.
Wickwire Bros., Cortland, N. Y.
Wickwire Spencer Steel Co., 41 East 42nd St., N. Y. C.

WIRE ROPE
American Steel & Wire Co. (U. S. Steel Corp. Subsidiary), Chicago.
Columbia Steel Co. (U. S. Steel Corp. Subsidiary), San Francisco, Calif.
Leschen, A., & Sons Rope Co., St. Louis, Mo.
Roebling's, John A., Sons Co., Trenton, N. J.
Wickwire Spencer Steel Co., 41 East 42nd St., N. Y. C.

WIRE ROPE FITTINGS
Roebling's, John A., Sons Co., Trenton, N. J.

WIRE STRAIGHTENING AND CUTTING MACHINERY—Automatic
Shuster, F. B., Co., The, New Haven, Ct.

WRENCHES
Armstrong Bros. Tool Co., Chicago.
Billings & Spencer Co., Hartford, Conn.
Williams, J. H., & Co., Buffalo, N. Y.

WRENCHES—Pipe
Greenfield (Mass.) Tap & Die Corp.

WRENCHES—Pneumatic
Ingersoll-Rand Co., 11 Broadway, N. Y. C.

ZINC—SLAB (Spelter)
New Jersey Zinc Co., The, 160 Front St., N. Y. C.

ZINC—Strip
Platt Bros. & Co., The, Waterbury, Conn.

ZIRCONIUM METAL & ALLOYS
Electro Metallurgical Sales Corp., 30 E. 42nd St., N. Y. C.

THE CLEARING HOUSE

Profitable Replacements

BORING MILLS—Horizontal and Vertical

N.B.P. No. 1½ portable, 3¾" bar horiz.
BEAMAN & SMITH 5" bar horiz.
BULLARD 24" vert.
BULLARD 42" New Era Type Vert.
N.B.P. 42", 44", 51", 52" vert.
COLBURN 54", 2 swivel hds. vert.
POND 90", 2 hds. vert.
NILES 10' vert.

PLANERS

CLEVELAND 48"x48"x16': 4 heads openside
AMERICAN 36"x36"x20': 3 hds.
CINCINNATI 36"x36"x12': 2 hds.
N.B.P. 48"x48"x16': 4 hds.

LATHES

NILES BEMENT POND 46"x15', Q.C.G.
PITTSBURGH 36"x28', grd. hd.
PUTNAM 36"x28', 3 step cone, DBG.
PUTNAM 36"x28', grd. head—Nearly New
BRIDGEFORD 36"x60' comb. boring and turning
BRIDGEFORD 36"x60' boring
McCABE 27-49x16' Double Spindle
LODGE & SHIPLEY 24"x10' cone dr.
GREAVES & KLUSMAN 16"x8' motor-in-base
PRATT & WHITNEY 16"x8' grd. hd. toolroom

MILLING MACHINES

BROWN & SHARPE No. 1 Vert.
CINCINNATI 24", 48" Automatic
INGERSOLL No. 3 Combined heavy duty Vert.
INGERSOLL 24"x24"x12', planer type
INGERSOLL 24"x24"x12', slab
NEWTON No. 2 Ver. spdle. keyseat
BROWN & SHARPE No. 4 Universal cone dr.
CINCINNATI Nos. 2, 3, 4 Plain
LEES BRADNER No. 4 thread
PRATT & WHITNEY 4½x12, 6x48, 6x80 thread
BECKER C-1 and C Vertical
BROWN & SHARPE No. 1Y Plain; latest type
KEARNEY & TRECKER No. 1B Vert. P.R.T.

42" BULLARD New Era Type Vertical Turret Lathe—
side head, cutting lubricant system

DRILL PRESSES

NATCO No. 12, No. 13, No. 22 Multiple spdle.
NATCO C11 Drill—mechanical feeds
NATCO C13H Drill—hydraulic feeds
PRATT & WHITNEY No. 12 rect. head

DRILLS—RADIAL

AMERICAN 3', 5' triple purpose
CINCINNATI BICKFORD 5' full Univ.
DRESES 3' and 5' Pl. SPD.
REED PRENTICE 4' Pl.

GEAR CUTTING EQUIPMENT

BROWN & SHARPE No. 4, 48" Gear Cutter
BARBER & COLMAN Nos. 3 and 12 Gear Hobbers
GOULD & EBERHARDT 18", 36" Hobbers
CLEVELAND 8 spdle. Spline Hobber
GLEASON 15" Spiral Bevel Gear Finisher
GLEASON 10" Spiral Bevel Gear
FELLOWS No. 8B Burnisher
FELLOWS Nos. 6, 61, 615
FELLOWS Nos. 7, 71
LEES BRADNER Lapper, cap. 1¼"x8"

GRINDERS

BRYANT No. 3 Internal
PERSONS ARTER 12" Rotary surf.
HEALD Nos. 50, 55, 60, 65 Intl.
HEALD No. 72 Hydr.: 72-A-3 Sizematic
LANDIS 10x24, 10x36, 10x72
DIAMOND 48" type H Surf.
NORTON type B3I 14x30x36" crankpin
DIAMOND 84" Face
PRATT & WHITNEY No. 14 surface

MISCELLANEOUS

FOSTER No. 1B, No. 3B Univ. Turret Lathe
BROWN & SHARPE No. 2F, No. 6F Screw Mach.
CLEVELAND ⅜": 2-2½": 2¼-2¾" Model "A"
TREADWELL 12" pipe mach.
LIBBY 18" model "A", 26"—7½" hole
LYND FARQUHAR 26" Shaper sgle. hd.
PRATT & WHITNEY No. 12 Profiler, grd.
GLEASON 12" Cutter Sharpener
REED PRENTICE No. 3 vert. die sinker, late type
ACME 2" all steel Upsetter
NAZEL No. 2B Hammer
TOLEDO No. 5½ D.C. Power Press
HENRY & WRIGHT 50 ton Die Press

ask for details
1000 other machines in stock

MOREY
MACHINERY CO., INC
410 BROOME ST. NEW YORK

GRINDERS

No. 2F Norton Lapper, m.d., latest type, like new
No. 2 Brown & Sharpe Automatic Surface, belt
No. 3 Brown & Sharpe Planer Type Surface, belt
No. 3 Wilmarth & Morman Automatic Surface, belt
No. 33 Abrasive Vertical Surface, m.d. in base
No. 78 Wilmarth & Morman Automatic Surface, m.d. in base
No. 210—8" Heald Ring & Surface, belt
12" Pratt & Whitney Vertical Surface, m.d.
18"x48" Diamond Light Duty Face, m.d.
60" Bridgeport Face, s.p.d.
No. 1 Landis Internal, belt
No. 3 Bryant Semi-Automatic Hole, m.d.
No. 3 Rivett Internal, belt
No. 11 Giddings & Lewis Teromatic, 3 motor drive
No. 15A Bryant Semi-Automatic Hole & Face, m.d.
No. 70 Heald Internal, belt
No. 103 Rivett Internal, belt
7½ H.P. United States Double End Emery, m.d.
No. 4 Gardner B.B. Disc, s.p.d.
No. 6 Diamond Disc, belt
No. 14 Gardner Double Disc, belt
No. 24—53" Gardner Horizontal Disc, m.d.
No. 120 Gardner Combination Disc, belt
No. 50, 55, 60, 65 Heald Cylinder, belt
6x18", 10x24", 10x36", 10x52", 10x72", 12x52", 12x72", 16x32" 16x52", 20x144" Landis Plain Self-Contained Cylindrical, m.d.
No. 11—6x32" Brown & Sharpe Plain, belt
6x32", 10x36", 10x50", 10x72", 12x72", 16x36" Norton Plain Cylindrical, belt and motor driven types
8x30" Modern Plain, m.d.
No. 14 Brown & Sharpe Plain, size 10x18"
12x36" Cincinnati Plain Cylindrical, belt
12x18" Cincinnati Plain, 3 motor drive, late type
No. 1 LeBlond Universal Tool & Cutter, belt
No. 1 Norton Universal Tool & Cutter, belt
No. 1½ Cincinnati Universal Tool & Cutter, belt
No. 2 Oesterlein Universal Tool & Cutter, belt
No. 3 Brown & Sharpe Universal Cutter & Reamer, belt
No. 2I, 3I, 4I Oliver Motor Driven Drill Pointers
18" Cincinnati Face Mill Grinder, m.d.
Gisholt Universal Tool Grinder, belt
Gleason Cutter Grinder, belt
Wm. Sellers & Co. Drill Grinder, m.d.
No. 1 Wilmarth & Morman Universal, belt
No. 2 Cincinnati 12x36" Universal, belt
No. 3 Brown & Sharpe Universal, belt
No. 4 Landis 12x66" Universal, belt

24"x16' Boye & Emmes Geared Head Quick Change Engine Lathe, arranged for vee belted motor drive. Brand new machine of the latest type, fully Timkenized. Complete with regular equipment, also taper attachment, oil pan, motor driven oil pump, follow rest. Shipped from factory in May, 1937, and has never been set up.

SHAPERS

15" Potter & Johnston Universal, m.d. thru gear box
16" American, s.p.d. thru gear box
16" Cincinnati, m.d. thru gear box
16" Smith & Mills, cone
20" Smith & Mills, cone
24" Gould & Eberhardt, s.p.d. thru gear box
24" Stockbridge, m.d.

BORING MILLS

24" Bullard New Era, m.d.
24" Bullard Rapid Production
30" Bullard Vertical, cone
30" Gisholt Vertical, cone
36" Bullard Vertical, cone
36" Colburn Vertical, cone
37" Niles Vertical, m.d.
42" Bullard Rapid Production, belt
60" Gisholt Vertical, m.d., p.r.t.
62" Niles Heavy Pattern, m.d., brand new
72" Niles Standard Pattern, m.d., brand new
72" Niles, cone
No. 1 Cleveland Horizontal, s.p.d.
No. 2 Niles Horizontal Boring & Drilling Machine, m.d., brand new

Write for our
New Stock List No. 38

The EASTERN MACHINERY CO.
1002 Tennessee Ave., Cincinnati, Ohio

SEND FOR "GREEN LIST"

Automatics—No. 2-G Brown & Sharpe
3¼" 4¼" Gridley Single Spdl.
4¼" Cleveland "Model A"
Boring Machines, 5" bar, N-B-P Floor Borer
5" Bar Newton Portable
No. 3 Hamilton, 4½" bar
No. 2 Ceffman, 3¾" bar
No. 36—Rochester Floor 3½" bar
No. 3A Universal—3" bar
No. 1 Cleveland, 2½" bar
Boring Mills, 24", 36", 42" Bullard "New Era"
42" and 48" Colburn
30", 52" and 62" King
54", 60" Colburn
Drills, 1, 2, 3, 4, 6 spdl. Leland-Gifford
1, 2, 3, 4, 6 Spdl. Henry & Wright
32" Cinn.-Bickford Slid. Hd.
No. 2 Colburn, 1, 2, 3 & 4 Spdl.
No. 3—24" Defiance
Nos. 121, 314 Baker
No. 210—1 and 3 spdl. Barnes
No. 25—36" Foote-Burt
No. 2 Western Multiple
No. 14 Natco Multiple
No. 4 Baush Multiple
Radials—3' Carlton sensitive
4' American Plain
5' American Triple Purpose
5' American full univ., M.D.
6' American Triple Purpose
Gear Cutters, No. 18-H Gould & Eberhardt
No. 2, No. 3, No. 12 Barber-Colman
No. ½ Pfauter Hobber
No. 18 HS Gould & Eberhardt
11" Gleason Bevel Gear Planer
No. 3—26" Brown & Sharpe
No. 4—48" Brown & Sharpe
No. 2—60" Goss Hobber
No. 6—60", No. 6—72", Brown & Sharpe
96" Newton Heavy Duty
Nos. 6, 61, 62, 65, 615, 625 Fellows
12"x72" G. & E. Rack Cutter
Grinders, Heim Centerless
16"x 48" Landis Crankpin
10"x 36", 52" Landis, plain
20"x168" Landis, plain M.D.
26"x 96" Landis, plain
No. 2 B. & S. Universal
No. 4—12"x66" Landis Universal
No. 60 Heald Cylinder
No. 70 Heald Internal
No. 10 Blanchard, M.D.
No. 16-A Blanchard Surface
15"x17"x6', 8' Norton, O.S. surf., mag. chuck

MOTOR DRIVE NORTON GRINDERS

6"x32"	14"x36"
10"x18"	14"x50"
10"x24"	14"x72"
10"x36"	14"x96"
10"x50"	16"x50"
10"x72"	18"x96"
10"x96"	18"x144"

Lathes, 14"x6' Lodge & Shipley
14"x 8' American
16"x 8' Lodge & Shipley, Taper Attach.
18"x 8' Lodge & Shipley
20"x14' L. & S., sel. grd. hd.
22"x12' Lodge & Shipley
24"x10', 14' American
24"x12', 14' Lodge & Shipley, sel. grd. hd.
24"x16' American Grd. Hd., T.A.
26"x10', 14' LeBlond Crankshaft
30"x11' American grd. hd.
30"x16' American
36"x18' Lodge & Shipley, patent head
36"x30' Rahn Larmon, grd. head
54"x23' Johnson, triple geared
66"x21' Putnam, triple geared
Millers, No. 24 Hvy. Ohio, plain
No. 2, No. 3, No. 3-S Cincinnati, plain
No. 2-B, No. 3-B Milwaukee
No. 2-B, No. 3-B, No. 4-B, B. & S., plain
No. 4 Cincinnati, plain
No. 1½, No. 2 B. & S. Universal
No. 2, No. 3 Cincinnati, H.P. Vert.
No. 3-B Milwaukee, Vert.
No. 4 Milwaukee, Model K
No. 3-B, No. 6 Becker
No. 5—48" Cincinnati Hydromatic
6"x48" Pratt & Whitney Thread
No. 3E & No. 4 Lees-Bradner
Hanson Whitney Thread
24"x24"x12' Ingersoll Slab
36"x36"x12' Newton Duplex
38"x44"x20' Ingersoll Slab
Planers, 24"x24"x6' American
30"x30"x 6' and 18' Cincinnati
30"x30"x14' Gray, Arr. Rev., M.D.
36"x36"x 8', 12', 18' Cincinnati
36"x36"x24' Gray
36"x36"x14'—24' Cleveland Open Side
42"x42"x30' Niles-Bement-Pond, arr. rev., M.D.
48"x48"x10' Detrick & Harvey, O.S.
48"x48"x16' Niles-Bement-Pond
60"x48"x16' Gray, arr. rev., M.D.
72"x60"x16' American
Turret Lathe, No. 4 W. & S. Univ. Grd. Hd.
No. 1-A Warner & Swasey
No. 2-A Warner & Swasey
No. 3 Cinn.-Acme, A.C. & B.F.
No. 3-A W. & S. Timken Brg.
No. 4-A Warner & Swasey, 7⅝" H.S.
No. 4-L Gisholt 9¼" H.S.

HILL-CLARKE
MACHINERY CO
647 Washington Blvd. - Chicago

CONSIDER GOOD USED EQUIPMENT FIRST

IMMEDIATE DELIVERY IS AN IMPORTANT FACTOR TODAY

AIR COMPRESSORS
136 cu. ft. 8"x 8" Chicago Pneumatic Class NSB
253 cu. ft. 10"x10" Chicago Pneumatic Class NSB
1300 cu. ft. 22"x13"x16" Ingersoll-Rand Class 10B2
1573 cu. ft. 22"x13"x14" Sullivan Class WN3
2678 cu. ft. 28"x17½"x21" Ingersoll-Rand Class PRE2

BENDING ROLLS
10' Ryerson, Belt Driven. ½" Capacity
10' McCabe, Arr. for M.D. ½" Capacity
10' Bertsch, Belt Driven. ¼" Capacity
20' Wickes, Arr. for M.D. ⅝" Capacity
24' Hilles & Jones, M.D. ⅞" Capacity
30' Hilles & Jones No 8. Arranged for Motor Drive. Capacity 1" Plate

BORING MILLS—HORIZONTAL
4" bar Toledo Floor Type, Motor Driven. QCG.
6" bar Niles Knee Type, Arranged for Motor Drive
7" bar Floor Type, Arranged for A.C. Motor Drive

FORGING MACHINES
2½", 3", 3½", 5" Ajax Steel Frame
5" AJAX HEAVY DUTY NEW MODEL, TWIN GEAR, TOP SUSPENDED HEADER SLIDE, MOTOR BRACKET
2", 5" National Steel Frame

GENERATING SETS
343 KVA General Electric 2300 v. 3 ph. 60 cy. Generator direct connected to 400 H.P. Rathburn Vertical Oil Engine
625 KVA General Electric 2300 v. 3 ph. 60 cy. Generator direct connected to Ingersoll-Rand Vertical Oil Engine

HAMMERS—BOARD DROP—STEAM DROP—STEAM FORGING
Chambersburg, Niles-Bement-Pond, Erie and Billings & Spencer 1200 lb. to 12,000 lb.

LEVELLERS
40" Hilles & Jones, Motor Driven. Capacity ¼"
50" National 17 Roll, 3⅝" diameter rolls
60" National 17 Roll, 4½" diameter rolls
60" Newbold 11 Roll, Arranged for Motor Drive. Capacity 3/16" Plate

PRESSES—STRAIGHT SIDE
No. 960 Toledo, 24" Stroke, 148" Between Uprights
No. 78½ Bliss, 10" Stroke, 36" Between Uprights
No. 304 Bliss, 4" Stroke, 18" Between Uprights

PRESSES—TOGGLE DRAWING
No. 412 Bliss, 86" Between Uprights
No. 1018 Bliss, 60" Between Uprights
No. 13 Bliss, 300 ton Capacity, Double Geared

PRESS—HYDRAULIC EXTRUSION
2000 ton Watson Stillman, 33" Diameter Ram, 36" Stroke, Strain Rods 11" dia. x 13½'

LATHE—TURRET
Libby, 4½" Hollow Spindle, Head has 6-3" Tool Holes. 24"—26" C Lathe, Motor Dr.

PLANERS—OPEN SIDE
36"x36"x16' Cleveland, Belted Motor Drive. One Rail and One Side Head
42"x42"x12' Cleveland, Arranged for Motor Drive. Two Rail and One Side Head
48"x48"x12' Cleveland, Belted Motor Drive. Two Rail and One Side Head

19 OVERHEAD ELECTRIC TRAVELING CRANES—ALL IN ONE PLANT
Various Makes, Capacities and Spans. Complete with 230 Volt D.C. Motors and Controls. Single and Double Hook. Single and Double Trolleys. Building to be dismantled and Cranes must be removed promptly.
Priced low for immediate disposition.
All are in first class operating condition.

NUMEROUS OTHER CRANES AVAILABLE IN VARIOUS CAPACITIES AND SPANS, BOTH A. C. and D. C.

GANTRY CRANES
35 ton McMyler Steam (Oil Fired) Traveling Crane 70' Boom, 15' Between Legs, 22' Portal Link Belt 2 Yard Steel Traveling Crane 100' Span 40' Cantilever, 45' Lift, 150' Length Overall

PRESSES—HYDRAULIC
450 ton Birdsboro 4-Column Flanging Press, 8'x12' Between Columns, 10' Daylight
500 ton Mesta 4-Column Vertical, 48"x48" Between Columns, 9' Daylight
1200 ton Southwark 4-Column Forging Press, 36"x48" Between Columns, 82" Daylight

PRESS—HYDRAULIC WHEEL
600 ton Niles-Bement-Pond, 48" Between Parallel Bars, Distance of ram 17". Motor Driven

PRESSES—TRIMMING
No. 2½ Billings & Spencer, 5" Stroke, 26" Between Uprights
No. 3 Billings & Spencer, 6" Stroke, 30" Between Uprights

TESTING MACHINE
150,000 lb. Riehle Bros. Three Screw Universal. Motor Driven. With Autographic Recorder

PUNCH & SHEAR COMBINATION
No 0 Buffalo Armor Plate Universal. Capacities: Punch, 11/16"x½" & ⅝"x⅝"; Shear Plates, ⅝"; Flats, 4"x½"; Rounds, 1¼"; Squares, 1⅛"; Angles, 4"x4"x¾"

ROLLING MILLS
8 "x 4½" Blake & Johnson Single Stand 2 High
4 "x 5 " Torrington Single Stand Two High
8¾"x10 " Belgian Three Stand Two High
9 "x10 " Columbia Two Stand 2 and 3 High
9 "x14 " Columbia Two Stand 2 and 3 High
10 "x12 " Single Stand Two High Finishing Mill
12 "x15 " Mackintosh Hemphill Single Stand 2 High
12 "x16 " Phila. Single Stand Two High
14 "x24 " Hill Clutch Two Stand Two High
15 "x38 " Waterbury Farrel Single Stand 3 High Rod Mill. Motor Driven. Capacity Round Bars 1⅝" down to ⅝"
20 "x30 " Birmingham Two Stand Two High
22" Lewis Three High Bar Mill. Complete with electric driven feed and tilting tables, runout tables, bull head electric driven thru Fawcus Gear electric driven pusher for cooling table
Train of Six 30" dia. Two High Hot Sheet Mills. Complete with Hot Mill Drive Motors, Regulators, Controls, Speed Reducers

ROLL—PLATE STRAIGHTENING
Hills & Jones. Arranged for Motor Drive. Six Rolls 133¾" dia. 10'6" Between Housings. Capacity 1" plate

SHEAR—GUILLOTINE TYPE
Garrison Bar Shear Arranged for Motor Drive. Length of Blade 9 1/16". Capacity 5" Rounds

SHEARS—ROTARY
Bliss, Belt Driven. Capacity ⅛"
Quickwork No. 6, M. D. Cap. up to ¾" plate

STRAIGHTENERS
7-Roll, For straightening angles, beams, channels, tees, zees. Arranged for Motor Drive. Capacity angles 2"x2" to 6"x6"
No. 1 Sutton-Abramson Round Straightening Machine. Capacity Bars ⅜" to 1½" dia. Tubes ⅜" to 2" O.D.

Pittsburgh Office 710 Park Bldg • Manufacturing **RITTERBUSH & COMPANY, INC** Equipment • Pittsburgh Phone Atlantic 1208

30 CHURCH ST. NEW YORK, N. Y.
Telephone Cortlandt 7-3437-3438

Confidential Certified Appraisals — *Consulting Engineering Service*

Liquidations—Bona Fide Auction Sales Arranged—Entire or Surplus Mfg. Equipment Inventories Purchased

OTT MACHINERY SPECIALS

American 16"x6' Geared Head Lathe, T.A.
Cincinnati 48"x36"x8' Planer, 2 Rail Heads
Cleveland Automatic, Model B ⅛ & 1¼", 18" feed
Gridley Automatics, ⅞, 1¼, 1⅝, 2¼ & 2⅝" 4 spdle., Model F
Hendey 16"x6' & 8' Yoke Head Lathes, T.A.
Heald Internal Grinders, Nos. 55, 70 & 75
Landis Plain Grinder, 10"x36" Self Cont'd, M.D.

Niles, Bement & Pond 36"x10' Geared Head Lathe, M.D.

Rochester 3½" bar Boring, Drilling & Milling Machine, M.D.

Warner & S. No. 2-A & No. 4 Universal Geared Head Turret Lathes
Western 5' Plain Radial Drill, M.D.

OTT MACHINERY SALES, Inc.
540 Second Avenue Detroit, Michigan

AUTOMATICS

100% REBUILT FOR IMMEDIATE DELIVERY

1—3¾" Four Spindle Model B Acme
1—1¼" Four Spindle Cone
1—No. 652 New Britain
1—No. 654 New Britain
1—No. 452 New Britain
1—No. 454 New Britain
1—No. 33 New Britain
1—4¼" Model L, S. S. Gridley
1—9/16" Model G, Gridley
1—1⅓" Model GA, Gridley
2—4" Model H, Gridley Chuckers
1—2¾" Model A, Cleveland
1—⅞" Model A, Cleveland
1—⅝" Model A, Cleveland
1—⅝" Model B, Cleveland
4—Four Spindle Cleveland Nut Machines
2—1¼"x18" Cleveland Shaft Machines
2—1½"x18" Cleveland Shaft Machines

Over sixty automatics in stock, Cones, Gridleys, New Britains and Clevelands.

100 Tons of new repair parts for Clevelands and Gridleys.

200 Emery wheels for 12" P&W Vertical Grinders. Also 30,000 left hand drills and 5,000 collets and pushers for Clevelands and Gridleys.

TUPHOLME COMPANY
P. O. BOX 115
PITTSFIELD, MASS.

BORING MILLS
1—No. 1 and No. 2 Barrett Horizontal
1—6" Espen Lucas Horizontal
1—12' Niles Vertical, M.D.
1—10-16' Betts Vertical, M.D.
1—84" Bullard Vertical
1—72" N-B-Pond Vertical
1—62" N-B-Pond Vertical
1—53" N-B-Pond Vertical
1—60" Colburn Vertical
1—60" Cincinnati Vertical
1—48" Colburn Vertical
1—36" Bullard Rapid Production

LATHES
1—100" x 50' N-B-Pond, M.D.
1— 65" x 32' Bement-Miles Heavy Duty
1— 36" x 20' Lodge & Shipley
1— 30" x 16' Houston-S-Gambel
1— 26" x 20' Sidney, Geared Head

PLANERS
1—84" x 84" x 18' N-B-Pond, M.D.
1—72" x 72" x 12' N-B-Pond, M.D.
1—48" x 48" x 18' Cincinnati, M.D.
1—42" x 42" x 22' Cincinnati, M.D.
1—36" x 36" x 14' Gray, M.D.

GEAR CUTTERS
1— 72" Cincinnati type G Cutter
1—100" Gould & Eberhardt Hobber

GRINDERS
1—40" x 20' Landis Heavy Duty Plain
1—No. 24 Gardner Disc
1—18" x 84" Landis Plain

MILLERS
1—No. 3 and No. 4 Cincinnati Plain
1—No. 5 Cincinnati Plain

SHAPERS
1— 6" Pratt & Whitney Vertical
1—24" Gould & Eberhardt, S.P.D.
1—24" American, M.D.
1—28" Columbia Heavy Duty

HAMMERS—ROLLS
1—5N Nazel Air Hammer
1—40" x 1" Southwark Bending Rolls, M.D.

SIMMONS MACHINE TOOL CORP.
ALBANY, N. Y. New York City, 149 Broadway
(Write for our latest stock list)

52" Gisholt Vertical Boring Mill, rapid traverse.
20" x 8' Springfield GH Lathe, 12 speed ballbearing head, MD.
30" x 16' LeBlond Lathe, cone head, TA.
No. 2 Mitts & Merrill Keyseater.
2 x 24" J. & L. Steel Head Flat Turret Lathe, MD.
No. 13 B. & S. Universal Tool & Cutter Grinder, BD.
16" Gould & Eberhardt Shaper, cone drive.
24" Gould & Eberhardt Shaper, gear box AC drive.
No. 1 Kempsmith Universal Miller, full equipment.
4-spindle Allen Drill, power feed to each spindle, MD.

BUFFALO MACHINERY CO., INC.
839 Grant Street Buffalo, N. Y.

6 sp. N.B.-GRIDLEY AUTOMATIC 1¾" x 7". New 1930. M.D.

60" COLBURN VERT. BORING MILL Power rapid traverse. S.P.D.

KENNARD & WILLIAMS, INC.
114 Liberty St. New York City

3A WARNER & SWASEY
Arranged for chucking with chuck and tools, serial 250,600.

THE O'BRIEN MACHINERY CO.
113 N. THIRD ST., PHILA., PA.

ENGINE LATHE
72" x 40'
PUTNAM Motor Drive Heavy Duty

ROSENKRANZ, WEISBECKER & CO., INC.
149 BROADWAY, N. Y. C.

THE CLEARING HOUSE

AIR COMPRESSOR
709', 18"x9¾"x12" Sullivan two stage angle compound with motor.

BROACH
No. 3 Oilgear hydraulic. Motor drive.

RADIAL DRILL
6' Niles Bement Pond full universal. Motor drive thru gear box.

GEAR HOBBERS
18'-30", No. 18H and 24"-30", No. 24H Gould & Eberhardt universal.

GRINDER
No. 2 Cincinnati centerless.

GRINDER
No. 72A3 Heald Sizematic internal. Also Nos. 70, 72 & 75 Heald and No. 12 Bryant.

HAMMER
No. 5, type I Nazel. Motor drive.

LATHE
16"x8' & 16"x10' Lodge & Shipley geared head, motor drive.

TURRET LATHE
24" Bullard vertical. Both New Era and Rapid Production types.

TURRET LATHE
No. 3A Warner & Swasey universal. Also Nos. 4 & 6 Warner & Swasey.

BORING MILL
42" King, 1 plain swivel head, 1 turret head, power rapid traverse.

UNIVERSAL MILLER
No. 3A Heavy Brown & Sharpe. Power rapid traverse, dividing heads, etc.

AUTOMATIC MILLERS
24" & 48" Cincinnati. Intermittent feed, automatic spindle stop, power rapid traverse.

OPENSIDE PLANER
48"x36"x10' Liberty, dial feeds, motor drive. Also 24"x6' Liberty, 30"x12' Cleveland & 36"x16' Cleveland.

COINING PRESS
600 ton No. 6K Cleveland knuckle joint.

DRAWING PRESSES
Nos. 1½B & 5A Bliss toggle. Also Nos. 266 Consolidated and DDG54 Ferracute cam drawing.

2000 Tools in Stock.

Send for List.

MILES MACHINERY COMPANY
SAGINAW, W. S. MICHIGAN

HIGH GRADE MACHINE TOOLS

LATHES
20"x10' American Grd. Hd., S.P.D.
36"x14' Boye & Emmes. Quick change Cone Drive, New.
24"x10' Hendey Geared Hd., S.P.D.
24"x10' Bradford Geared Hd., Arr. M.D.
2—36"x30' Lodge & Shipley Selective Geared Head, S.P.D. Two carriages. Like New.
30"x18' Lodge & Shipley Lathe, 3 S.C.D., DBG.
20"x10' American Grd. Hd., S.P.D.

GRINDERS
16"x72" Landis Plain, Self Cont.
16"x48" and 72" Landis Crankshaft.
Nos. 50, 55, 60, 65 and 70 Healds.

GEAR CUTTERS
No. 6—60" Brown & Sharpe Gear Cutter.
No. 615 Fellows. 24-H G. & E. Hobber.
18-H Gould & Eberhardt Hobber.
6", 11", 18" Gleason Gear Generators.

BOLT AND PIPE THREADERS
2" Acme Class A Bolt Cutter.
6" Landis Pipe Machine, cone drive.
2" Landis Pipe Machine, cone drive.
1" double spindle Landis Bolt Cutter.
18" Landis Pipe Threader.

BORING MILLS
44" Niles, two heads.
24", 36" & 42" Bullard "New Era" A.C. Motor dr.
60" Niles Boring Mill, 2 heads.

MILLING MACHINES
No. 2 Rockford Universal, complete.
No. 4 Cincinnati Pl. HI-Power, S.P.D.
No. 5A Brown & Sharpe Univ., S.P.D.
No. 5B Becker Vertical Miller.
No. 4 Cincinnati Univ., S.P.D.
No. 3 Cincinnati High Power Plain, S.P.D.
No. 2 LeBlond H.D. Univ. complete.
No. 3 Kempsmith Universal.

PLANERS
42"x42"x10' Cleveland Open A.C., M.D.
26"x26"x 8' Cleveland Openside.
36"x36"x10' Gray, 2 Hds.

RADIAL AND UPRIGHT DRILLS
2½, 3, 3½, 6' Cinci-Bick., S.P.D.
5'—6' arm American Triple Purpose, S.P.D.
6' arm American Triple Purpose, S.P.D.
4' Heavy Duty Fosdick, S.P.D.

SHAPERS
16", 20", 24" G.&E., mtr. dr. thru g.b.

Write for Complete Catalog. We Buy, Sell & Exchange

CINCINNATI MACHINERY & SUPPLY CO.
28 West Second St. Cincinnati, Ohio

ATTRACTIVE PRICES

Pond Heavy Duty Lathe, 36" x 10', 3-step Cone, Taper Att., Plain Change Gear.
No. 2 Brown & Sharpe Universal Miller, Cone Drive.
Burr Slab Miller, 11 x 84" Power Feed Table with Hor. and Vert. Heads.
Gould & Eberhardt Cutter Grinder.
Gould & Eberhardt Gear Cutter, No. 2120.
Pratt & Whitney Thread Miller, 14 x 6, Pan Type.
Barrett Cylinder Boring Mill, 5-inch Bar.
Whitcomb 4-head Planer, 42 x 42 x 16'.
Woodward & Powell 4-head Planer, 42 x 42 x 15.
Sellers Vertical Car Wheel Boring Mill, 48-inch Rotary Table.
Gleason Lathe, 48" swing, 13' bed, Dbl. Back Geared, Plain Change, 3-step Cone, Internal Drive.
Gage Lathe, 114" Swing, 15' Bed, 5-step Cone, Cone Drive, Plain Change Gear.
Planer with 2 Heads, 7 x 18', suitable for planing stone.
Cincinnati-Bickford Radial Drill, 6 Foot, Single Pulley Drive.
Lodge & Shipley Engine Lathe, Geared Head, Single Pulley Drive, 20" x 10'.
Cincinnati Planer, 36 x 36 x 72", 2 Heads, Belt Driven.
Hendy Lathe, 14 x 6, Overarm.
Bells Forging Hammer, Air 2000 lbs. Capacity.
Bausch Multiple Drill Press, Rectangular Head, 8 Ball Bearing Morse Tapered Spindles, with 20"—"T" Slotted Box Table.

KAMIS MACHINERY COMPANY
3rd & Moore Sts., Philadelphia, Pa.

60" x 60" x 14'
NILES-BEMENT-POND PLANER

3 heads—rapid traverse—box table—forced lubrication—reversing motor drive.

Like New

BUFFALO MACHINERY CO., INC.
839 Grant St. Buffalo, N. Y.

REBUILT—GUARANTEED

No. 4G LeBlond Plain Miller, G.H., S.P.D.
No. 3 LeBlond Plain Miller, cone drive
No. 3 B. & S. Plain Miller, cone drive
No. 3 B. & S. Universal Grinder, belt drive
No. 2 B. & S. Surface Grinder with Magnetic Chuck
16"x48" Landis Crank Shaft Grinder
12"x72" Landis Plain Grinder
21"x12' LeBlond Lathe, cone drive
27"x10' Greaves Klusman Lathe, cone drive
27"x10' American 8 speed Geared Hd., S.P.D.
3' American Radial Drill, Gear Box, S.P.D.
4½' Morris Radial Drill, Gear Box, S.P.D.
24" G. & E. Shaper, cone drive
20" Stockbridge Shaper, cone drive
15" P. & J. Shaper, Universal Table, cone drive
6' and 10' Robinson Press brake

Send for complete stock list

IROQUOIS MACHINERY CO.
656 Ohio Street Buffalo, N. Y.
Phone Washington 1513

SCREW MACHINES

3—Brown & Sharpe No. 4 Motor Driven Automatic Screw Machines; bought new 1928.

Condition excellent

Write for special price

Botwinik Brothers, Inc.
78 Water Street New Haven, Conn.

BECKETT PLANER
36" x 36" x 12'; 4—HEADS; MOTOR DRIVE with MOTORS; 230 Volts Direct Current; **BARGAIN.**

BENDING ROLLS
10' x ½" H. & J. Plate Bending Roll; Belt Drive; Drop End Housing; Balance Bar; Hand Screw Adjustment to Forming Roll; Top Roll 10½" Dia.; Bottom Rolls 8½" Dia. **BARGAIN.** Photo on request.

BENDING BRAKE
D&K No. 203; "CHICAGO"; 10' x 12 ga. Arr.; Motor Drive.

ENGINE LATHE
PITTSBURGH QUICK CHANGE; 60" Swing; 18' Bed; 9' 6" Centers; Paper Attachment; Arranged with 230 Volt Direct Current Motor Drive. **BARGAIN.**

RADIAL DRILL
6' Niles-Bement-Pond; Full UNIVERSAL; Arranged direct connected Motor Drive thru Quick change Gear Box. 15" Round Col.; Tee Slot Base; full Universal Table. Photo on request; Very fine Drill; **BARGAIN.**

Send us your inquiries—We'll each profit
Our stock is very large. We'd like to quote on your needs.

FALK MACHINERY & SUPPLY COMPANY
No. 18 WARD STREET ROCHESTER, NEW YORK

SPECIAL OFFERINGS

Circle Shear & Flanger, No. 407-A Niagara. Cap. ¼"x60" Circle
Driller, Moline 6-Spindle "Hole Hog"
Hammer, 1100 lb. Niles Steam
Planer, 48" x 60" x 12' Gray, 3 Hds.
Planer, 16' Niles Plate, Hyd. Beam
Radial, 5' Pond Plain
Radial, 6' American Plain
Riveter, Hanna ⅞" capacity, 30 ton
Shear, No 34-B Lennox Throatless

THE E. L. ESSLEY MACHINERY CO.
829 W. Evergreen Ave., Chicago, Illinois

HEAVY DUTY PLATE DRILL

80 Spindle Hill Drill No. 1-F equipped with 80 No. 3 M. T. heads and 25 No. 5 M. T. heads adjustable for center distance on the rail; 26' between housings; motor driven. Write for full specifications and photograph.

Many Other High Grade Machines

INDUSTRIAL MACHINERY COMPANY
2100-2300 Fletcher Ave. Indianapolis, Ind.
Drexel 3300.

INGERSOLL-RAND 2 STAGE AIR COMPRESSOR —TYPE XRB—7x10 and 11x10—Complete with Motor
Nos. 4 & 6 WARNER SWASEY HAND SCREW MACHINE
30"x12' AMERICAN—16"x8' LODGE & SHIPLEY ENGINE LATHES, Cone Drive with Taper attachment
16", 20", 24", 28" GOULD & EBERHARDT SHAPERS, SINGLE PULLEY DRIVE AND CONE DRIVE
Nos. 70 & 75 HEALD INTERNAL GRINDERS
AVCY BALL BEARING DRILLS, 1, 2, 3 spindles
No. 2, 3 CINCINNATI MILLERS—PLAIN & UNIVERSAL CONE DRIVE
No. 2 DIAMOND SURFACE GRINDER
PARTIAL LIST — SEND US YOUR INQUIRIES.

INDIANAPOLIS MACHINERY & SUPPLY CO., INC.
1959-69 South Meridian Street, Indianapolis, Indiana

Planers, Milling Machines
Drill Presses, Grinders
Shapers, Lathes, Boring Mills

Monarch Machinery Co.
325 No. 3rd St., Phila., Pa.
All Monarch Machine Tools Are Sold on Approval

No. 3 Cincinnati Plain Milling Machine, S.P.D.
No. 3 Lodge & Shipley Duomatic, M.D.

D. E. DONY MACHINERY CO.
47 LAURELTON ROAD ROCHESTER, N. Y.

TRUSTEES' SALE

REAL ESTATE AND LEASEHOLD INTEREST STOCK, MACHINERY AND EQUIPMENT OF

ANNANDALE GRAPHITE CORP'N

ANNANDALE. CLINTON TWP., HUNTERDON CO., N. J.

On Main Line of Central R. R. of N. J.

TO BE SOLD AT AUCTION

TUESDAY, DECEMBER 28, 1937 AT 12 NOON

On the Premises

REAL ESTATE: Timber Manufacturing Building, Warehouse, etc., on Case Farm, 135 Acres with dwellings and farm buildings; Frech Farm adjoining 34 Acres; Also Apgard Farm, 90 Acres with houses and buildings.

STOCK: 24,000 lbs. of refined flake Graphite 93 to 97% C.

MACHINERY AND EQUIPMENT: 3 Traylor and Buchanan 10 x 16 in. jar type **Ore Crushers;** 2 Traylor 14 x 30 in. double roll **Crusher Rolls;** 2 Marcy 2 x 4 rod and Hardinge 30 in. conical ball **Roller Mills;** Type A 1804 and A 1808 **Flotation Machines;** 3 Door and Caldwell 6 x 6 and 8 x 11 **Thickener Tanks** with Agitators; 2 Hummer single and double 2 and 3 deck **Vibrating Screens;** Wood Frame Vibrating Screens; 5 Six Roll Three Tier 10 x 45 in. Finishing Rolls; Oliver Filter and Christy Dryer unit comprising Oliver Filter, Centrifugal and Vacuum Pumps with Reeves transmissions and motors, Christy rotary dryer, with Reeves transmission and motors. Ray Oil Burner, 2 American blowers with motors and Brown electric pyrometer and recorder; Lidgerwood single drum 26 x 40 in. **Hoist** with Burke 75 HP AC motors and controls; Lidgerwood single drum 36 x 48 in. hoist, rope pull 4200 lbs. complete with Lilly hoist control and G. E. 60-20 HP. intermittent induction motor and controls; Oliver, Cameron and Gould **Vacuum and Centrifugal Pumps;** G. E., Westinghouse and Burke A. C. induction and synchronous constant speed, constant varying and intermittent speed **electric motors** from 2 to 100 HP, 220 V. 60 C. 3 Ph.; Westinghouse automatic starters, 3 AC and DC motor generator sets. 100 ft. all steel bucket type floor conveyor, canvas belt conveyor, vises, electrical equipment, railroad track, steel shafting with pulleys and hangers, large quantity leather and canvas belting, office furniture, etc.

Descriptive Catalogs upon application to

SAMUEL T. FREEMAN & CO., Auctioneers

1808-10 CHESTNUT STREET, PHILADELPHIA

27 William St., New York — 80 Federal Street, Boston

POWER PRESSES

No. 78 Toledo Gapframe Single Crank
No. 45-D-60 Cleveland Double Crank
No. S-51 Ferracute Double Crank
No. 507 Bliss Single Crank tierod frame
25 ton Henry & Wright Dieing machines
No. 3½-B Bliss toggle drawing, 5½" draw
No. 13 Bliss toggle drawing, 12½" draw
10" ram Southwark Hydraulic presses
58 KVA Thomson Spot Welders, M. D.

J. N. MOYER

471 North Fifth St. — Philadelphia, Pa.

POWER PRESSES

BLISS, TOLEDO, V & O, ETC.
REBUILT—GUARANTEED

JOSEPH HYMAN & SONS

Tioga, Livingston and Almond Streets
Philadelphia, Pa.

1—No. 10-62" Bliss Double Crank Press: Tie rod construction; 10" shaft; 9" stroke.
1—Pond Planer: 8'-5" between housings, 84" under rail; 25' table; 4 heads; belted motor drive.
1—Kane & Roach Angle Bending Roll: 2½"x2½"x ⅜"; motor drive.
1—No. 4 Hille-Jones Guillotine Bar Shear: Cap. 4" rounds ½" D.
1—28" Queen City Shaper: Single pulley drive.

Beatty Machine & Manufacturing Company

936—150th Street — Hammond, Indiana

No. 58 Toledo Press, 6" str., B.D.
No. 9 Buffalo Bar Shear, 3" Cap., M.D.
42" & 48" Aetna Std. Sheet Levelers, M.D.
48" Ryerson Friction Saw, M.D., 220/3/60.
5-ton Case Crane, 65'3" span, 220 V., D.C.
6x6x¾" Dbl. Angle Shear, M.D.
60"x60"x20' Pond Planer, B.D.
28"x64" Farrel Roll Grinder, M.D.
10'-16' Betts Boring Mill, M.D.
42" King & 62" Betts Bor. Mills.

WEST PENN MACHINERY CO.
1210 House Bldg., Pittsburgh, Pa.

FORGING MACHINE

1½" Acme All Steel, 8" stroke, for motor drive. Weight 18,000 lbs. Used very little. Fine condition. Attractive price.

PRESSES

95-E Toledo D.C., D.B.G. Tie-Rod, 10" stroke, 85" betw. housings, friction clutch. Spring knockout, for motor drive. In excellent condition.

59¼ Toledo S.C., D.B.G. Tie-Rod, bed 40x40", 8" stroke, Fctn Clutch, B.D., Good.

78½ Bliss S.C., D.B.G., Tie-Rod, 10" stroke.

77½ Bliss S.C., D.B.G., Tie-Rod, 8" stroke, with Marquette Cushions.

57 Toledo S.C., D.B.G., 16" stroke, bed 24"x24", Friction Clutch, for belt drive.

MARR-GALBREATH MACHINERY CO.

55 Water Street, PITTSBURGH, PA.

AIR HAMMER

6-N NAZEL MOTOR DRIVE Excellent Condition

ROSENKRANZ, WEISBECKER & CO., INC.

149 BROADWAY, N. Y. C.

No. 95E TOLEDO DOUBLE CRANK PRESS, Ram 74" x 9", tie rod
No. 59¼ TOLEDO S.S. TIE ROD PRESS
EMBOSSING PRESSES, 400 and 600 Ton
DOUBLE ANGLE SHEARS: Kling 6"x6" x1" 8"x8"x1"
BULLDOZERS: Nos. 1 to 26, No. 24 Vert.
UPSETTING and FORGING MACHINES: 1" to 5"
5000 LB. ERIE DOUBLE FRAME FORGING HAMMER
No. 5B NAZEL HAMMER, Belt Drive, Cap. 6" sq.
BUFFALO BAR SHEAR: No. 8 for Rounds, Flats and Structural shapes
400 TON WHEEL PRESS
PRESSES: Solid Back, Incl. and Trimming
STRUCTURAL MACHINERY: Punches, etc.
TENSILE TESTERS: 20,000, 40,000 and 200,000 lb.
THREADING MACHINES: ⅜" to 4" Single and Double Spindle, lead screws
D & K BENDING BRAKES: 10' x 3/16"; 10' x 16 ga. pan
NIAGARA SHEAR: 10' x 18 ga.
YODER SLITTER: 36" x 16 ga.
BOLT, NUT and RIVET MACHINERY: Headers, Trimmers, Thread Rollers, Slotters, Stud Threaders, Tappers, Burring Machines, etc.

DONAHUE STEEL PRODUCTS CO.

74th St. & Ashland Ave. — Chicago, Ill.

LARGE ALLIGATOR SHEAR

No. 1 Carlin Alligator Shear; cap. 6"; knives 42" long.

LOUIS E. EMERMAN & CO.

1761 ELSTON AVE., CHICAGO

M S & E

MIDLAND STEEL & EQUIPMENT CO.
400 So. Clinton St. Chicago, Ill.

Offers

A
$60,000.00
COMPLETE CONTINUOUS PICKLING UNIT
for
$3,500.00
Must be moved by Jan. 15th

Conveyor Type Blowers—Motors—Five Large Tanks—Structurals—Complete

GANG SLITTER

1—12" Waterbury Farrel Gang Slitter.
Cutting Capacity: 1/32"-¼" Thickness; ¼"-12" Width with 225 New Cutters 4.482 I.D. by 8.25 O.D. Range of thickness from 7/32"-1", with 25 H.P. Motor and Starter.

ROLLER CHAIN

10,000 ft. Link Belt Roller Chain RC 150 1-½" pitch x 15/32" x 15/32".

TUMBLING MILLS

1-40 Keg.	Size of Drum	48" dia. x 60" lg.
1-25 Keg.	" " "	36" dia. x 56" lg.
1-25 Keg.	" " "	37" dia. x 49½" lg.
1-10 Keg.	" " "	30" dia. x 32" lg.

KEG HEADING MACHINE
1-#8 Morgan Keg Heading Machine with 3 H.P.Mtr.

Brake, 10' x 10 ga. Ohl, press type
Bulldozer, No. 9 Williams-White
Gang Slitter, Braddock, 36" x 11 gauge
Press, No. 58 Toledo S.S., grd., 35,000 lbs.
Presses, Nos. 6 & 7A Niagara, OBI, grd.
Shear, No. 2120 Niagara, 10' x 14 ga.
RELIANCE MACHINERY SALES COMPANY
1403 Brighton Place, N.S., Pittsburgh, Pa.

Cameron No. 83 Automatic Bodymaker with Soldering Attachment.
Cameron No. 80-D Bodymakers.
Adriance No. 125 and No. 126 Double Seamers.
In A-1 Working Order
ACME MACHINERY COMPANY
40 ELIZABETH ST. NEW YORK CITY

Bliss No. 22N Bodymaker with Soldering, Beading, Flanging Attachment.
Cameron No. 53 Automatic Seamer.
Bliss No. 12N Bodymaker—Beading and Flanging Attachment.
Bliss No. 225 Power Slitter.
Bliss No. 81 Double Seamer.
Bliss Automatic Strip Feed Presses.
R. & S. MACHINERY CO.
19 Howard St., New York City

HYDRAULIC PUMPS

2—**Elmes** 2¼"x6" Horizontal Duplex Double Acting; 32 G.P.M. at 3000 lb. press. Arr. M. D.

1—**Elmes** 2⅞"x12" Horizontal 4 Plunger, 90 G.P.M. at 3000 lb. press. Arr. M. D.

1—**Deane** 3½"x14" Vertical Triplex 110 G.P.M. at 2500 lb. press. Arr. M. D.

LOUIS E. EMERMAN & CO.
1761 ELSTON AVE. CHICAGO, ILL.

1 Keller No. E-202 Die Sinking Machine, M.D.
1 Bliss No. 3½ Toggle Drawing Press.
1 Ferracute No. EG-54 Knuckle Joint Press.
1 Pels No. 16 Combination Iron Worker, motor driven.
1 Blake & Johnson 12" x 12" Cold Rolling Mill.
6 Shuster Wire straightening & cutting machines.
3 Baird No. 1, No. 2 & No. 3 four slide wire machines.
1 Cleveland Double Crank Power Press, 6" stroke.
NATIONAL MACHINERY EXCHANGE
128-138 Mott St. New York, N. Y.

TWO FANS, No. 140, manufactured by Clarage Foundry Mfg. Co., Kalamazoo, Mich. Floor size 36" x 108"; elevation 84"; shaft size 3 3/16". Both arranged for belt drive on one side, but without motors. Fans are 84" in diameter with 8 blades, 20" wide.

ALSO ONE FORCED DRAFT FAN, manufactured by Garden City Fan Company of Chicago, Ill. Floor size of this fan is 42" x 80"; elevation 75", shaft diameter 2 7/16". Arranged for belt drive on both sides, but without motor. Fan 60" in diameter; 8 arms and blades 30" wide.

SWEET'S STEEL COMPANY
Williamsport, Pa.

3-ton Heroult Electric Furnace

Complete installation including Transformers and all electrical equipment. Rare opportunity to secure nearly new equipment at bargain price.

FALK MACHINERY & SUPPLY CO., INC.
18 WARD ST.—ROCHESTER, N. Y.

2—400 Amp. Hansen Gasoline Engine Driven Portable Welders.
1—Model 600 P. & H. Caterpillar Crane, 50 ft. boom, 39 in. magnet.
1—7½ ton P. & H. Overhead Traveling Crane, D.C. motors, 70 ft. span.
1—350 ft. and 1—500 ft. Ingersoll-Rand E.R.-1 Air Compressors.
MERTES MACHINERY COMPANY
1622 S. 1st Street Milwaukee, Wisconsin

For sale, one **HAMILTON CORLISS ENGINE,** 800 H.P., 26" bore, 42" stroke, manufactured by the Hooven Owens Rentschler Company of Hamilton, Ohio. Engine in good condition, complete with steam trap and separator, also 90 ft. of 8" steam line but without jack shaft. A bargain if action taken promptly. Wire or 'phone **SWEET'S STEEL COMPANY,** Williamsport, Penna.

CHICAGO'S LARGEST & MOST COMPLETE STOCK

Electric Power Equipment

MOTORS	1000 HP Cro. Wheel. Syn. 600 rpm. 750 HP El. Mach'y Syn. 514 rpm. 500 HP Al. Chal. Slip'g 450 rpm. 200 HP Gen. Ele. Slip'g 600 rpm 150 HP Al. Chal. Squi-Cge. 720 rpm. 200 HP West. Squi-Cge. 1200 rpm. 100 HP G.E. Vert. Slip'g 900 rpm.
D. C. GEN	250 KW Westinghouse 600 rpm.
PLATERS	7500 Amp. H.V.-W. 6/12 volt. 4000 Amperes Burke 6/12 volt. 1500 Amperes Colum. 6/12 volt.
WELDER	500 Amperes Westinghouse.
AIR COMPR.	2600 CFM Sullivan Syn. Driv. 1100 CFM Bury Compressor. 870 Gardner-Denver 340 CFM Sullivan 260 rpm.
MOTOR GEN. SETS	750 KW West. Syn. 125/175 V. 500 KW Gen. Electric Synchronous 175 KW Synchronous Complete 150 KW Gen. Ele. Syn. Complete Many Others—All Capacity
TURBO GEN.	1250 KVA Westinghouse Condensing. (Many Others—Various Capacities)
TRANS-FORMERS	3—100 KVA Maloney 12m/460 volt. 1—54 KVA Kuhl. Dry 440-110/220.
ALTER-NATORS	1250 KW Ideal 1200 rpm. 750 KVA Cr. Wheel. 600 rpm. 500 KVA El. Mach'y 514 rpm. 375 KVA Gen. El. 225 rpm. 300 & 240 KVA G.E. 720 rpm.

Over Quarter Century Satisfactory Service
Send For Our Catalogue, It's Free

CHICAGO ELECTRIC CO.
1322 W. 22nd St. Chicago, Ill.

BOILERS, 4—OHIO STANDARD ERIE WATER TUBE 350 HP. with Stokers & 45' x 75' Steel Boiler House.

5 Pen. Standard BW. Sterling 825 Hp. with Stokers
250 KW Steam Engine Generator NEW
10 ft. Robinson Leaf Brake 12 Gauge MD.
2000 CFM. Spencer Turbo Blower DC Motor
Baker Low Lift Truck Edison Batts.
1½ ton Baker Tractor Crane 12 ft. Boom Exide Batts.
12 x 16 x 12 Wheeler Steam Pump New
30 x 12 ft. Lodge & Shipley Lathe CD. QC.
8 Spindle Baush Drill Press CD.
6 ft. Prentice Radial Drill, CD.
Cooper Machinery Co., Youngstown, O.

MODERN
AIR COMPRESSORS
All Types and Sizes
Rebuilt-Guaranteed
EARL E. KNOX COMPANY
8 West Second St. Erie, Pa.

AIR COMPRESSORS

BELTED—176 ft., 355 ft., 540 ft. 676 ft., 752 ft. & 1300 ft.
ELECTRIC—355 ft., 528 ft., 676 ft. 807 ft., 1302 ft., 1728 ft. 2022 ft., 3600 ft. & 5000 ft.
STEAM—368 ft., 500 ft., 800 ft., 1221 ft., 1640 ft., 2200 ft. & 3000 ft.
DIESEL—368 ft., 602 ft., 900 ft. & 1300 ft.
R. C. STANHOPE, INC.
875 Sixth Ave. New York, N. Y.

PRICED RIGHT FOR QUICK SALE
1—350 ft. Westinghouse Traction Brake Air Compressor Type 3-VS-30 complete with 30 HP 220V AC Synchronous Motor including Automatic Pressure Control Equipment.
SCULLY-JONES & COMPANY
(Fdry. Div.)
1905 So. Rockwell St. Chicago, Ill.

MAGNETIC SEPARATOR

30"x24" C H magnetic separator pulley, 220 volts.
We also have in stock various sizes of separator magnets.
GOODMAN ELECTRIC MACHINERY CO.
1060 Broad St. Newark, N. J.

BLOWERS

GENERAL ELECTRIC
CENTRIFUGAL
SPENCER TURBO

All motor drive with motor

3—	9000	cu. ft.	1½#	press.	$1450.00 ea.
1—	5900	" "	¾#	"	200.00
1—	5400	" "	1½#	"	450.00
1—	4200	" "	2#	"	475.00
1—	3200	" "	1#	"	150.00
2—	2100	" "	¾#	"	250.00 ea.
1—	2000	" "	1½#	"	300.00
2—	1100	" "	¾#	"	150.00 ea.
2—	750	" "	2#	"	150.00 ea.
1—	270	" "	1½#	"	200.00

LOUIS E. EMERMAN & CO.
1761 ELSTON AVE., CHICAGO, ILL.

FOR SALE

GENERAL ELECTRIC TURBO ALTERNATOR

1250 KW, 3600 RPM, 2300 Volt, 3 Phase, 60 Cycle, Condensing Type with direct connected 125 volt exciter.

This unit is now in operation but will be released about February 1, 1938.

For Further Information and Inspection Address

ALUMINUM COMPANY OF AMERICA
SURPLUS & TRANSFER DIVISION
801 Gulf Building, Pittsburgh, Pa.

"Anything containing IRON or STEEL"

IRON & STEEL PRODUCTS, Inc.

BUYERS SELLERS TRADERS
Chicago (Hegewisch Sta.), Illinois
Phone South Chicago 9430

FOR SALE

CARS and LOCOMOTIVES
2—21-ton Porter S/T, 36" G.
1—90-ton 0-8-0 Switcher, 15'6" W.B.
30 TON S. G. GAS - SWITCHING LOCO.,
AUTO. DUMP CARS, S. G. unless noted
36— 5-ton Western, 36" Steel, Ex. cond.
4—12-yd. Western, Wood, Fair condition.
24—12-yd. Western, Steel, Ex. cond.
12—20-yd. Western, 1920, Steel, Good cond.
16—20-yd. Magor, 1918, Steel, Ex. cond.
4—20-yd. Koppel, 1928, Steel, Ex. cond.
5—30-yd. Clark, Steel.
50—10,000 Gal. Tank Cars, Cheap.
CAR REPAIR PARTS
Complete Shaft Iron Mining Outfit, Electric. Send for list.
Nordberg track shifter.
Also Hoppers, Gons., Flat, Box, etc.
STEEL Bridge, 14'-8" clearance, two sections 101' each, Cooper's E-40.
6½ YD. BUCYRUS ELECTRIC SHOVEL
BUILDINGS
62'x400' with crane runway.
New Shop Bldg., never erected, 445'x730'; five-section for 20-ton Cranes. Will split.
2—50'x300' Steel Sheds.
ALSO OTHER BUILDINGS.
CRANES: TRAVELING and POWER:
2—20-ton Whiting, OH.
1— 5-ton Whiting, OH.
1—Each, 10, 15 & 20-ton gantries.
1—1-yd. 301 Koehring Gas Cat. Crane
1—10-ton Brownhoist crawler.
1—15-ton Brownhoist loco. type with Gen.
1—30-ton Browning, loco. type.
1—20-ton O&S, loco. type.
1—2-yd. Monighan dragline.
2—Mine Hoists, electric, 100 & 200 H.P.
NEW G. E. O. H. CRANE MOTORS
Replace your old ones cheaply!
28—3 to 50 HP Var. & Const. Speed Motors.
9, 50 HP; 8, 25 HP; 7, 20 HP; 3/60/440.
Ball-bearing Slip-ring with Brakes & A-B controls.
HOWELL, AC. 9, 3; 6, 6; 5, 10; 3, 15 HP.
1, 300 KW, 600V DC Rotary Con. & Trans. 6 PH.
ENGINES, GENERATORS, ETC.
1—1000 KW G.E. con. Turbo-Gen. 3/60/2300.
3— 938 KVA non-con. Turbo-Gen. 3/60/2300.
3— 500 KW G.E. con. Turbo-Gen. 3/60/2300.
1—50 HP, 1—20 HP, 1—5 HP steam.
1—each 30, 75, 100 & 150 KW DC eng.-gens.
2—120/175 HP Winton gasoline engines.
1—48" x 100' steel smoke stack.
150 KVA—3/60/220 Belted.
BOILERS, ETC.
2—350 HP, 4—500 HP B. & W. with super heaters & chain-grate stokers.
1—50 HP, 1—100 HP fire box.
2—2000 HP open feed Water Heaters.
AIR COMPRESSORS
1—1800 C.F. IR steam driven.
1— 888 C.F.—I.R. Type XB2 Belted.
1— 700 C.F.—I.R. Type IU steam.
2— 500 C.F. I.R. steam driven.
PUMPS
1—10" full manganese, gravel.
2—1000 GPM—350 FH Motor Driven.
1— 900 GPM—350 FH Motor Driven.
1— 500 GPM—450 FH Turbine Driven.
1— 450 GPM—350 Turbine Driven.
15—Misc., elec. & steam.
MERCHANT STEEL NEW
35 tons Rounds & 5 tons Flats, Kansas.
11 tons SAE 3140 Half Rounds, Texas.
TINPLATE COBBLES
20-30-36 & 48" C.I. Pipe, Valves & Fittings.
Extra Heavy Steel Pipe, Valves & Fittings.
7/8" I.D.—1" O.D. Admir. Brass Tubing
Send for our Bulletins

WANTED
MILLS and BLAST FURNACES
ELECTRIC MELTING FURNACES
STEEL BUILDINGS ANY LOCATION.
CRANES: O. H., GANTRY LOCO. & TRACTOR
CARS and LOCOMOTIVES
CAR REPAIR PARTS
SCRAP: TUNGSTEN BEARING
BUYERS SELLERS TRADERS
Send for our Adgit Pencil.

D.C. MOTORS—230 VOLTS

H. P.	MAKE	TYPE	SPEED
2—500	General Electric	MPC	180/350
1—400	Westinghouse	QS	450/675
1—400	General Electric	MPC	160/300
2—300	Westinghouse	SK	150/300
2—200	General Electric	DMC	300/600
1—125	Westinghouse	SK-210	225/900
1—125	General Electric	DMC	150/300
8—120	General Electric		300/900
1—100	Westinghouse	SK	475/1000
5— 60	Electro Dynamic	25-S	525/1050
6—40/50	Crocker Wheeler	EM	175/700
1— 35	Westinghouse	SK	500/1500
17— 25	General Electric	LC	650/1950
4— 10	Westinghouse	SK-90	500/1500
20— 7½	Westinghouse	SK-70	500/1500

Large Stock of FULLY GUARANTEED A.C. and D.C. MOTORS—GENERATORS—TRANSFORMERS —M.G. SETS and POWER PLANT MACHINERY.

BELYEA COMPANY, INC.
147 West 18th St. New York City.

FOR SALE

300 KW G.E. Modern MG set 250v DC. 2300v/3ph/60 cy 35% leading P.F. complete. Especially desirable for P.F. correction.
2500 HP AC Mill motor Type MT. G.E. 2300/3/60/240 rpm with Mesta Reduction Gear. Excellent Condition.
4—700 HP G.E. Sl. Rg. motors type MT 2200/3/60/393 rpm with contactor control—2 or 3 bearing.
4—500 Same as above at 450 rpm.
1—810 cu. ft. 100 lb. pres. Bury Compressor belted to 139 HP Syn. motor complete.
25—G.E. crane motors types C01807-C02504-C02505 all 250 volt D.C.
150 KW G.E. M-G set 250 v. D.C. 2200/3/60/AC Syn. motor with swbds.
150 KW Westinghouse, same as above.

Large stock of D.C. variable speed motors and slip ring motors carried in stock

MOORHEAD-REITMEYER CO., INC.
Columbia Bldg. Pittsburgh, Pa.

Save up to 75%. Check with Moreco before buying. Hundreds of reducers in stock — immediate shipment. Completely overhauled and guaranteed like new. Speed reducer specialists. We buy, sell, exchange. Specify horsepower, speed ratios and application. Write

THE MOTOR "REPAIR" MANUFACTURING CO.
1553 HAMILTON AVE. • CLEVELAND, OHIO

WE OWN AND OFFER

1—10 ton P & H O. H. Crane with 3 ton Aux. Hoist, Serial No. 6005 45'—3" span 4 Motor A.C. 3 phs. 60 cy. 220 volt. Excellent Condition. Price $2250.00 F.O.B. Cars our plant.
1—Ingersoll Rand 575' Air Compressor 2 stage 15 x 9 x 12 with Air Receiver and unloaded 100 lbs. belted to 105 H.P. Westinghouse A.C. Motor 3 phs. 60 cy. 2300 volt. "Almost New" Complete $1900.00 F.O.B. Our plant.
50—50 Ton Flat Cars. All Steel Underframe. C.S. Side Frames at Chicago. Excellent Condition. Priced Right.

This is only a few of our items.

WRITE, WIRE OR CALL FOR OUR LIST OF Motors, Generators, Compressors, Boilers, Cranes, Buildings, etc.

FREESE ENGINEERING CO.
1500 E. Belleview Place Milwaukee, Wis.

USED STEAM AND ELECTRICAL EQUIPMENT

Steam Turbines, Motor Generator Sets, Belted and Direct Connected A.C. and D.C. Generating Units, Boilers, Rotary Converters, Motors, Transformers, Etc.

ARCHER & BALDWIN, INC.
75 West Street, New York
Tel.—BOwling Green 9-9275—9276

"OVERHEAD CRANES & HOISTS"
I Own and Offer the Following:

1—7½-ton Morgan, 3-motor, 65' 0" span, 220 vo. D.C. Steel mill type.
2—5-ton Case, 3-motor, 65' 0" span, 220 vo. D.C. General Electric motors.
1—3-ton P. & H., 3-motor, 28' 0" span, 220 vo. 3 ph. 60 cy. cage controlled.
1—2-ton Northern, 16' 9" span, 3-motor, 220 vo. D.C. Low head room type.

JAMES P. ARMEL, 925 Fulton Bldg., Pittsburgh, Pa.

LOCOMOTIVE CRANE: Link Belt 15 Ton, 55 ft. Boom, 8 Wheels.
AIR COMPRESSOR: Ingersoll-Rand Type NEI 12¼x12, Belt Drive.
Located in East and priced extraordinarily low if purchased before removal to our warehouse.

DONAHUE STEEL PRODUCTS CO.
74th St. & Ashland Ave. Chicago, Ill.

---

10 ELECTRIC YARD CRANES

2 to 10 ton A.C. Traveling and Stationary. 60' to 100' Radius, Full Swing. Operative inspection by appointment. Extraordinary values NOW. *Also Overhead Cranes and Hoists.*

N. B. PAYNE
105 W. 55th St., N. Y. Tel.: Circle 7-6730

OVERHEAD ELECTRIC CRANES

(2)—3-ton Shepard, 32'0" span, 230-V.D.C.
5-ton Maris, 28'2" span, 230-V.D.C.
5-ton Shepard, 40'0" span, 230-V.D.C.
3-ton Chesapeake Gantry 50'0" span.
3-motor type, 220/440-V.A.C.
20-ton Northern, 65'0" span, 230-V.D.C.
10—1 to 5 ton Shepard Electric Hoists.

T. B. MacCabe Co.
Beury Bldg., Broad & Germantown Ave., Phila., Pa.

ELECTRIC HOISTS — CRANES

Bought — Sold — Rented

ELECTRIC HOIST & MOTOR CO.
149 N. 9th ST. BROOKLYN, N. Y.

THE CLEARING HOUSE

BUSINESS Opportunities

Procurement Division, Public Buildings Branch, Washington, D. C., Nov. 19, 1937.—Sealed proposals in duplicate will be publicly opened in this office at 1 P.M., Dec. 28, 1937, for construction of the U.S.P.O. at Sandwich, Ill. Upon application, one set of drawings and specifications will be supplied free to each general contractor interested in submitting a proposal. The above drawings and specifications MUST be returned to this office. Contractors requiring additional sets may obtain them by purchase from this office at a cost of $5 per set, which will not be returned. Checks offered as payment for drawings and specifications must be made payable to the order of the Treasurer, U. S. Drawings and specifications will not be furnished to contractors who have consistently failed to submit proposals. One set upon request, and when considered in the interests of the Government, will be furnished, in the discretion of the Assistant Director, to builders' exchanges, chambers of commerce or other organizations who will guarantee to make them available for any sub-contractor or material firm interested, and to quantity surveyors, but this privilege will be withdrawn if the sets are not returned after they have accomplished their purpose. W. E. Reynolds, Assistant Director of Procurement, Public Buildings Branch.

• • • CONTRACT MANUFACTURING • • •

• • • • EMPLOYMENT EXCHANGE • • • •

EMPLOYMENT SERVICE

HELP WANTED

TUBING SALESMAN FOR OHIO TERRITORY. Commission and salary basis. Expect good acquaintance with industrial field. Can give opportunity for capital investment. In answering indicate age, experience and other fundamental factors. Address Box A-769, care *The Iron Age*, 428 Park Bldg., Pittsburgh, Pa.

HELP WANTED

WANTED—PRODUCTION MAN. To superintendents or assistant superintendents of first class plants making heavy machinery and who have proven themselves real producers we offer an unusual opportunity. Must be A-1 mechanic between 35 and 40 and have thorough knowledge of machine shop operations, plate and sheet metal forming and welding. Foundry and pattern shop experience helpful but not essential. Do not waste postage answering unless you fill above specifications. To receive consideration, give in first letter, your age, education, training, places employed, lengths of service and salary expected. All replies in absolute confidence. Address Box S-495, care *The Iron Age*, 239 W. 39th St., New York.

WANTED: DIRECT OR MANUFACTURER'S AGENT thoroughly familiar with the sale of merchant steel pipe in any one of the following territories: Los Angeles, St. Paul, New Orleans, Cleveland and Chicago. Address Box S-496, care *The Iron Age*, 239 W. 39th St., New York.

SALES AGENTS FOR NEW ENGLAND. Manufacturer of Bars, Bolts, Nuts, Spikes, etc., requires representative with own office. Must have following among Railroad, Industrial and Hardware trade. Give references and qualifications. Address Box S-494, care *The Iron Age*, 239 W. 39th St., New York.

SITUATIONS WANTED

GRADUATE METALLURGICAL ENGINEER, age 35, experienced in production welding and welding development of steel, stainless steels, and other alloys; coating of welding electrodes; capable of supervising production of welded pressure vessels and process equipment; completely familiar with x-ray and gamma-ray radiography of welds and castings. At present employed, desires position in supervision of pressure vessel and process equipment production; in sales engineering or promotion where metallurgical training and experience in fabrication, welding, etc., of steel and stainless alloys will be valuable; or other opening where indicated qualifications would be applicable. Opportunity is prime consideration. Address Box S-487, care *The Iron Age*, 239 W. 39th St., New York.

INDUSTRIAL SELLING EXPERIENCE AVAILABLE. If you need selling, promotional or advertising brains in your business, this offers an exceptional opportunity to secure the services of a man outstanding in experience and reputation as an industrial sales and advertising manager with many records of success to his credit. This man has exceptional ability to organize and lead men—knows industrial selling methods, distribution and markets—Outstanding reference. Address Box S-474, care *The Iron Age*, 239 W. 39th St., New York.

DETROIT SALES ENGINEER. Established there fifteen years successfully contacting mechanical executives. Practical Mechanic. Technical Graduate. Seeks sound line to sell on commission. Address Box S-491, care *The Iron Age*, 239 W. 39th St., New York.

SITUATIONS WANTED

MANUFACTURING EXECUTIVE — with an interesting record in handling management, sales, finance, production and other vital duties in connection with machinery, tool, foundry and allied industries is available for position as General Manager of medium-size company requiring mature, dependable ability that produces results. Experience covers all positions from Accountant to Secretary-Treasurer including fifteen years as General Manager. Ability to develop efficient organization and build up sales, production and net profits assured by previous record. Address Box S-498, care *The Iron Age*, 239 W. 39th St., New York.

SALES REPRESENTATIVE with office in Chicago covering Illinois, Wisconsin, Iowa and Northern Indiana. Have best of contacts with machinery manufacturers, machine shop, drop forge plants and coal strip mining. Desire additional line on commission basis. Successful sales references. Address Box 7631-A, care *The Iron Age*, 802 Otis Bldg., Chicago, Ill.

SALES ENGINEER EXPERIENCED in contacting industrial plants in Middle West, headquarters Chicago. Have also sold diesel engines, air compressors and allied tools and equipment. Some drafting experience. Immediately available. Address Box S-497, care *The Iron Age*, 239 W. 39th St., New York.

PERSONNEL DIRECTOR; SEASONED EXECUTIVE; mechanical engineer familiar all phases manufacturing; employment; vestibule training; welfare; safety; hospitalization; insurance; incentives; wage systems. Address Box S-481, care *The Iron Age*, 239 W. 39th St., New York.

DISTRICT SALES MANAGER—Philadelphia resident twenty years—well acquainted with industrial plants, architects, engineers, offers aggressive and intelligent representation to manufacturer air conditioning or other equipment. Address Box S-486, care THE IRON AGE, 239 W. 39th St., New York.

ACCOUNTANT — AUDITOR — OFFICE MANAGER. Fine record in charge for several manufacturers with 150 to 500 employees. Now employed. Want change for position offering moderate salary and good future opportunity. Address Box S-489, care *The Iron Age*, 239 W. 39th St., New York.

SALES REPRESENTATIVE — available January 2nd—Pennsylvania and Middle Atlantic States—for manufacturer of machinery or equipment used by Industrial Plants. Address Box S-490, care *The Iron Age*, 239 W. 39th St., New York.

WELL EDUCATED PRODUCTION ENGINEER with administrative and executive experience including direct responsibility for as many as 500 men engaged in highly varied factory operations. Address Box S-488, care *The Iron Age*, 239 W. 39th St., New York.

ADVERTISERS INDEX

CLASSIFIED SECTION

THE Steel Industry has been a substantial user of Cleveland Worm Gear Speed Reducers ever since 1917. Demands for Clevelands have grown in proportion to size and diversity of equipment employed in modern steel production. The confidence of Management in steel plants that Clevelands will deliver volume power under all conditions, has been continually justified.

Cleveland Worm Gear Drives are thus the industry's popular choice for literally hundreds of separate uses because this Company has applied itself for a quarter century to building Worm Gearing exclusively, under continuous engineering and design research and in a plant largely tooled with equipment made to order.

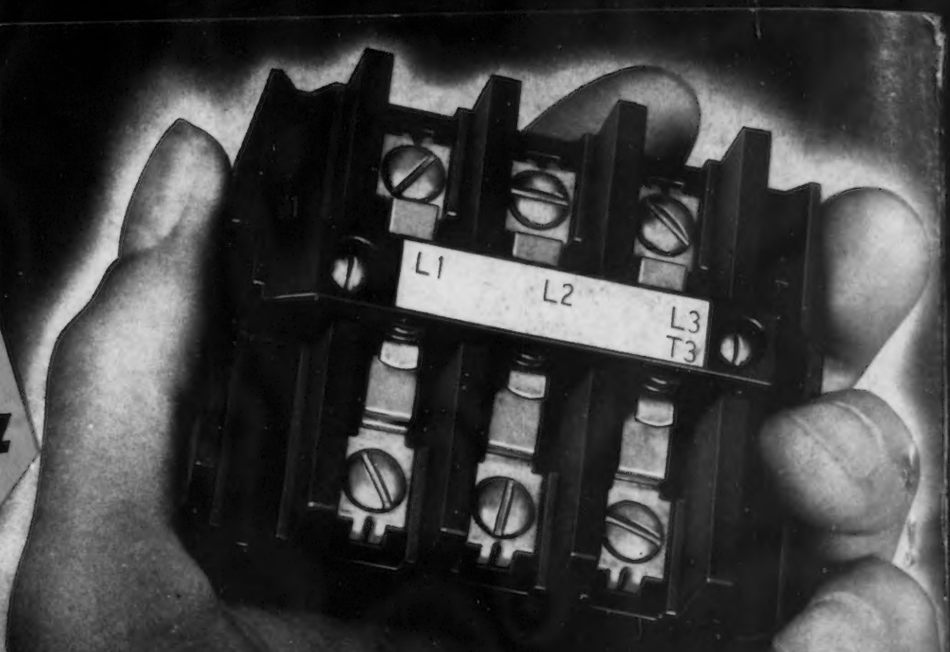
Clevelands operate for 10, 15 or more years, even in the Steel Industry, with practically no wear or maintenance expense.

Cleveland Representatives in important steel manufacturing districts are in touch with your Engineers, or will gladly call upon request. The Cleveland Worm & Gear Company, 3252 E. 80th St., Cleveland, Ohio.

Affiliate: The Farval Corporation, Cleveland, Manufacturers of Centralized Systems of Lubrication

★ CLEVELAND *Worm Gear Drives*

This is the heart - of a new high in starter design



. . . This "heart" of the new Cutler-Hammer line . . . a remarkable new small-size structure permits advantages never available before

FOR a.c. motors 2 h.p. and below . . . in a small size never before achieved. They possess a ruggedness and dependability never before available in this size, and an ease of accessibility which traditionally belongs to much larger units. From such minor details as self-centering terminal screws to such major features as the new improved C-H Thermal overload, this Motor Control is packed with advanced engineering features. For the first time this new C-H line offers interchangeability of parts between manual and automatic Motor Control. New simplicity is achieved. For example, loosen one screw to remove the entire operating mechanism. The operating mechanism is mounted on rubber to lessen vibration. Lightning fast twin-break, silver-to-silver contacts; unit base construction; better-vision interiors . . . these are but part of the amazing list of features. And in a size never before achieved.

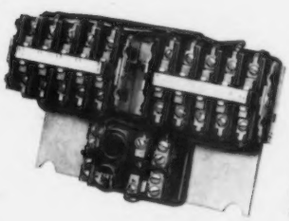
AND AT A PRICE! You will want to know this line, the best news of the day for machine designers and machine buyers alike. Write or wire for complete details. CUTLER-HAMMER, Inc., *Pioneer Manufacturers of Electric Control Apparatus*, 1325 St. Paul Ave., Milwaukee, Wis.

BULLETIN 9115 MANUAL
(NEMA Size 0 Non-reversing)

Modern styling. Japanned steel case. Also skeleton mounting for built-in use. Push-button start, stop, overload reset. Start button and case can be locked against tampering. Improved C-H Eutectic Alloy, free-tripping thermal overload relay of new unit construction. Starter rating changed by changing heater coils.

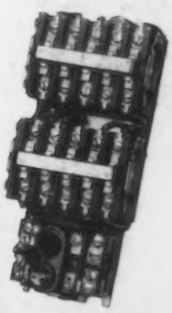
BULLETIN 9592 AUTOMATIC
(NEMA Size 0 Non-reversing)

All moving parts pivoted for correct alignment, quiet operation, absence of friction. Magnet coil vacuum-impregnated, long-lived, moisture-proof, heat-conducting. Safe pick-up and drop-out voltage assured. Also skeleton mounting for built-in use.



BULLETIN 9595
AUTOMATIC REVERSING
(NEMA Size 0)

Offers all features of this new C-H design including improved thermal overload protection with overload indication. Horizontal or vertical arrangement as desired in either skeleton or standard enclosures.



CUTLER-HAMMER
MOTOR CONTROL
C-H